HP ProLiant ML330 Generation 3 Server Setup and Installation Guide

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Part Number 322383-001

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About This Guide

This guide provides step-by-step instructions for installation, and reference information for operation, troubleshooting, and future upgrades for the HP ProLiant ML330 Generation 3 server.

Audience Assumptions

This guide is for the person who installs, administers, and troubleshoots servers. HP assumes you are qualified in the servicing of computer equipment and trained in recognizing hazards in products with hazardous energy levels.

⚠ Important Safety Information

Before installing this product, read the *Important Safety Information* document included with the server.

Symbols on Equipment

The following symbols may be placed on equipment to indicate the presence of potentially hazardous conditions:

WARNING: This symbol, in conjunction with any of the following symbols, indicates the presence of a potential hazard. The potential for injury exists if warnings are not observed. Consult the documentation for specific details.

This symbol indicates the presence of hazardous energy circuits or electric shock hazards. Refer all servicing to qualified personnel.

WARNING: To reduce the risk of injury from electric shock hazards, do not open this enclosure. Refer all maintenance, upgrades, and servicing to qualified personnel.

This symbol indicates the presence of electric shock hazards. The area contains no user or field serviceable parts. Do not open for any reason.

WARNING: To reduce the risk of injury from electric shock hazards, do not open this enclosure.

This symbol on an RJ-45 receptacle indicates a network interface connection.

WARNING: To reduce the risk of electric shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into this receptacle.

This symbol indicates the presence of a hot surface or hot component. If this surface is contacted, the potential for injury exists.

WARNING: To reduce the risk of injury from a hot component, allow the surface to cool before touching.

These symbols, on power supplies or systems, indicate that the equipment is supplied by multiple sources of power.

WARNING: To reduce the risk of injury from electric shock, remove all power cords to completely disconnect power from the system.

This symbol indicates that the component exceeds the recommended weight for one individual to handle safely.

Weight in kg
Weight in lb

WARNING: To reduce the risk of personal injury or damage to the equipment, observe local occupational health and safety requirements and guidelines for manual material handling.

Rack Stability

WARNING: To reduce the risk of personal injury or damage to the equipment, be sure that:

- **The leveling jacks are extended to the floor.**
- **The full weight of the rack rests on the leveling jacks.**
- **The stabilizing feet are attached to the rack if it is a single-rack installation.**
- **The racks are coupled together in multiple-rack installations.**
- **Only one component is extended at a time. A rack may become unstable if more than one component is extended for any reason.**

Symbols in Text

These symbols may be found in the text of this guide. They have the following meanings.

WARNING: Text set off in this manner indicates that failure to follow directions in the warning could result in bodily harm or loss of life.

CAUTION: Text set off in this manner indicates that failure to follow directions could result in damage to equipment or loss of information.

IMPORTANT: Text set off in this manner presents essential information to explain a concept or complete a task.

NOTE: Text set off in this manner presents additional information to emphasize or supplement important points of the main text.

Related Documents

For additional information on the topics covered in this guide, refer to the following documentation:

- *HP ProLiant ML330 Generation 3 Server Quick Start* poster
- *HP ProLiant ML330 Generation 3 Intel Xeon Processor Installation Instructions*
- *HP ProLiant ML330 Generation 3 Rack Enabling Kit Installation Instructions*
- *HP Internal Two-Bay Hot-Plug SCSI Drive Cage Installation Instructions*
- *HP ProLiant ML330 Generation 3 Server Maintenance and Service Guide*
- *Servers Troubleshooting Guide*
- QuickSpecs

Getting Help

If you have a problem and have exhausted the information in this guide, you can get further information and other help in the following locations.

Technical Support

In North America, call the HP Technical Support Phone Center at 1-800-652-6672. This service is available 24 hours a day, 7 days a week. For continuous quality improvement, calls may be recorded or monitored. Outside North America, call the nearest HP Technical Support Phone Center. Telephone numbers for worldwide Technical Support Centers are listed on the HP website, www.hp.com.

Be sure to have the following information available before you call HP:

- Technical support registration number (if applicable)
- Product serial number
- Product model name and number
- Applicable error messages

- Add-on boards or hardware
- Third-party hardware or software
- Operating system type and revision level

HP Website

The HP website has information on this product as well as the latest drivers and flash ROM images. You can access the HP website at www.hp.com.

Authorized Reseller

For the name of the nearest authorized reseller:

- In the United States, call 1-800-345-1518.
- In Canada, call 1-800-263-5868.
- Elsewhere, see the HP website for locations and telephone numbers.

Reader's Comments

HP welcomes your comments on this guide. Please send your comments and suggestions by e-mail to `ServerDocumentation@hp.com`.

1

Component Identification

Features

The HP ProLiant ML330 Generation 3 server provides performance, reliability, and ease of ownership with support for two Intel Xeon processors and up to 4 GB of ECC Registered PC2100 DDR SDRAM memory, all running on a 533-MHz front-side bus. Expansion support includes four 64-bit, 33-MHz PCI expansion slots.

Industry standard peripheral features include a Broadcom 5702, 10/100/1000 network interface controller, keyboard/mouse/video connectors, dual USB ports, and serial interface.

SCSI model servers ship with a single-channel Wide Ultra3 SCSI controller in a slot and ATA model servers ship with an integrated dual-channel ATA/100 controller with support for RAID 0, 1, and 1+0. The system has capacity for:

- Five 36.4-GB non-hot-plug SCSI hard drives for a maximum of 182 GB of internal storage
- Four 80-GB ATA hard drives for a maximum of 320 GB of internal storage
- Two 146.8-GB hot-plug SCSI hard drives in the optional two-bay hot-plug SCSI drive cage and three 36.4-GB non-hot-plug SCSI hard drives for a maximum storage capacity of 402.8 GB of internal storage

The server is rack-mountable within HP, Compaq branded, and most third-party racks, with the optional rack-enabling kit. Telco support is possible with the rack-enabling kit and optional telco rail kit.

For software features, refer to Chapter 5, “Server Configuration and Utilities.”

Front Panel Components

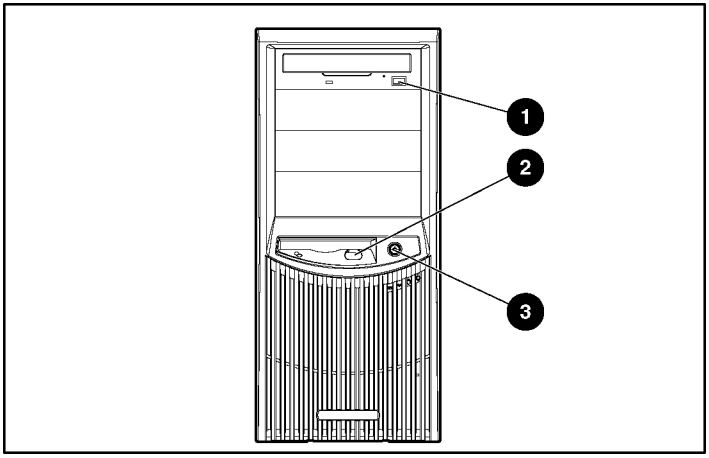


Table 1-1: Front Panel Components

Item	Description
1	CD-ROM drive eject button
2	Diskette drive eject button
3	Power On/Standby button

IMPORTANT: The Power On/Standby button does not remove all power from the system. The Standby mode removes power from most of the electronics and the drives, but portions of the power supply and some internal circuitry remain active. To remove power completely, disconnect all power cords from the server.

Front Panel LEDs

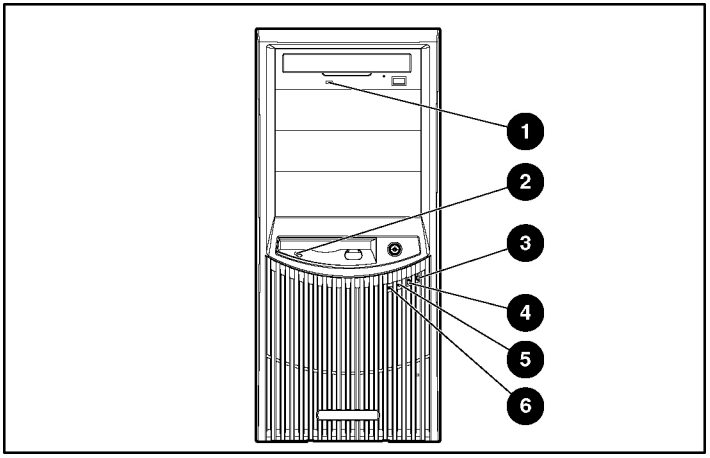


Table 1-2: Front Panel LEDs

Item	LED Description	Status
1	CD-ROM drive activity	On = Drive activity exists.
2	Diskette drive activity	Off = No drive activity exists.
3	System power	Green = Server is on.
		Amber = Server is in standby mode.
		Off = Server is off; power cord is disconnected.
4	Hard drive activity	Green or flashing green = Hard drive activity exists.
		Off = No hard drive activity exists.

continued

Table 1-2: Front Panel LEDs *continued*

Item	LED Description	Status
5	NIC link/activity	Green = Network link exists. Flashing green = Network activity exists. Off = No network link exists.
6	Internal health	Green = Server is powered up and server health is good. Amber = Server health is degraded; a pre-failure warning exists. Red = Server health is critical; attention is required. Off = Server is off; power cord is disconnected.

Media Components

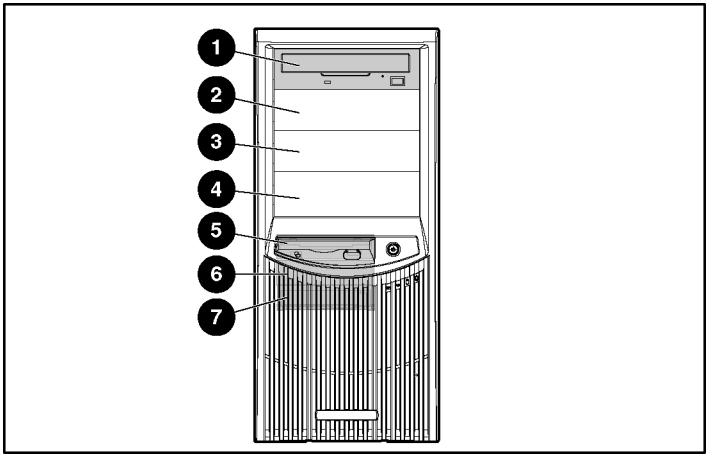


Table 1-3: Media Components

Item	Description	Location	Dimensions
1	IDE CD-ROM drive	Media bay 1	13.34 × 4.06 cm
2	Available removable media bay	Media bay 2	(5.25 × 1.60 in)
3	Available removable media bay	Media bay 3	
4	Available removable media bay	Media bay 4	
5	Diskette drive	Hard drive bay 1	8.90 × 2.54 cm
6	Hard drive bay	Hard drive bay 2	(3.5 × 1.0 in)
7	Hard drive bay	Hard drive bay 3	

Rear Panel Components

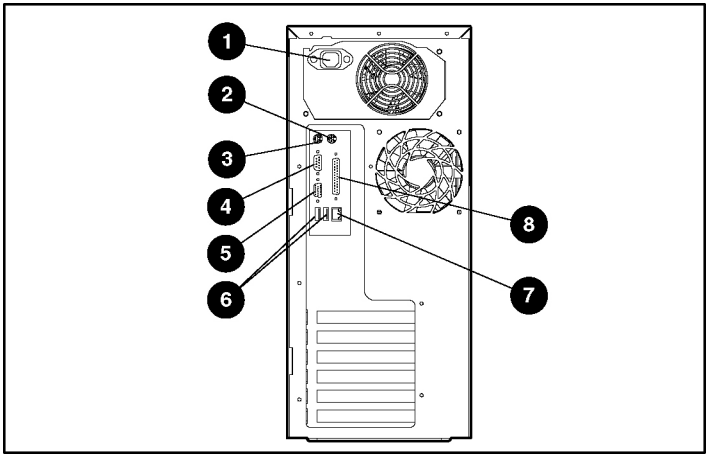


Table 1-4: Rear Panel Components

Item	Description
1	Power connector
2	Mouse connector
3	Keyboard connector
4	Serial connector (A)
5	Video connector
6	USB connectors
7	RJ-45 connector
8	Parallel connector

Rear Panel LEDs

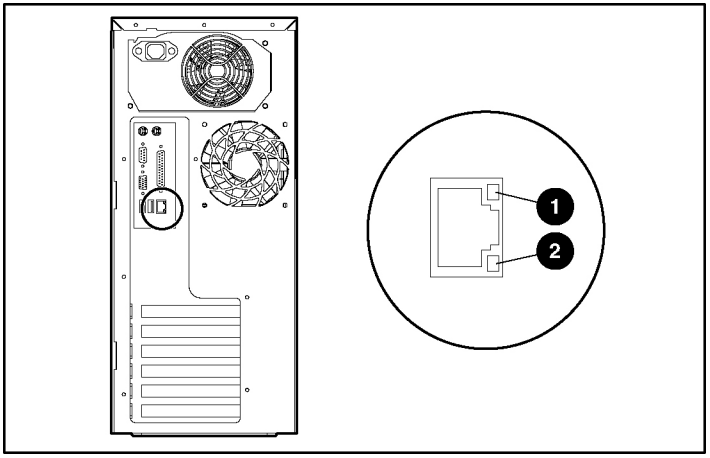


Table 1-5: Rear Panel LEDs

Item	LED Description	Status
1	Network activity	Flashing green = Network activity exists. Off = No network activity exists.
2	Network link	Green = Network link exists. Off = No network link exists.

System Board Components

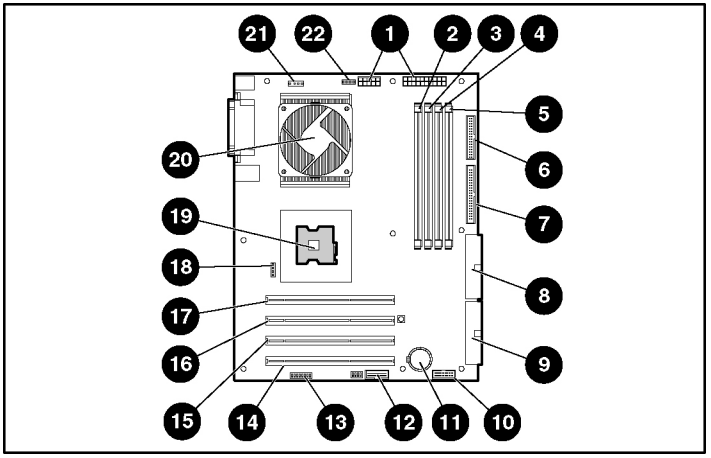


Table 1-6: System Board Components

Item	Description	Item	Description
1	Power supply connectors	12	Remote Insight connector (30-pin)
2	DIMM slot 4	13	System configuration switch
3	DIMM slot 3	14	Expansion slot 4
4	DIMM slot 2	15	Expansion slot 3
5	DIMM slot 1	16	Expansion slot 2
6	Diskette drive connector	17	Expansion slot 1
7	IDE connector (ATAPI devices)	18	Processor fan connector 2
8	ATA/100 RAID primary connector	19	Processor socket 2
9	ATA/100 RAID secondary connector	20	Processor socket 1 (populated)
10	Power button assembly connector	21	System fan connector
11	System battery	22	Processor fan connector 1
Note: In SCSI model servers, the SCSI controller populates expansion slot 1.			

System Configuration Switch

CAUTION: Clearing nonvolatile RAM (NVRAM) deletes the system configuration. Refer to Chapter 5, "Server Configuration and Utilities," for instructions on configuring the server.

Table 1-7: System Configuration Switch Settings

Position	Default	Description	Status
1	Off	Reserved	—
2	Off	Lock configuration	Off = Configuration can be changed
			On = Configuration is locked
3	Off	Tower/rack configuration	Off = Tower configuration
			On = Rack configuration
4	Off	Diskette boot	Off = Server uses RBSU diskette boot selection
			On = User can override RBSU diskette boot selection and boot from diskette
5	Off	Password override	Off = Password protection is active
			On = User can override password
6	Off	Clear CMOS and NVRAM	Off = No function
			On = Server configuration is erased at power-up
7	Off	Reserved	—
8	Off	Reserved	—

Note: Switch positions 1, 7, and 8 are reserved for authorized service providers only.

System ID Switch

The system ID switch is reserved for use by authorized service providers only. Do not change the indicated default settings.

Jumper Settings

SCSI Device Jumper Settings

No two SCSI devices connected to the same SCSI controller can have the same SCSI ID. If another SCSI device is connected to the controller, check its SCSI ID before beginning the installation procedure for the additional device. Jumpers located on each device set the SCSI ID. For more information, refer to the SCSI device option documentation.

IDE Device Jumper Settings

When installing any IDE devices (ATA hard drives, ATAPI CD-ROM drives, or ATAPI tape drives), be sure that the jumper on the device is set to Cable Select (CS). This setting allows the cable to automatically assign the device ID of an IDE drive attached to the cable. For information on installing and cabling IDE devices, refer to Chapter 4, "Hardware Options Installation."

System Board LEDs

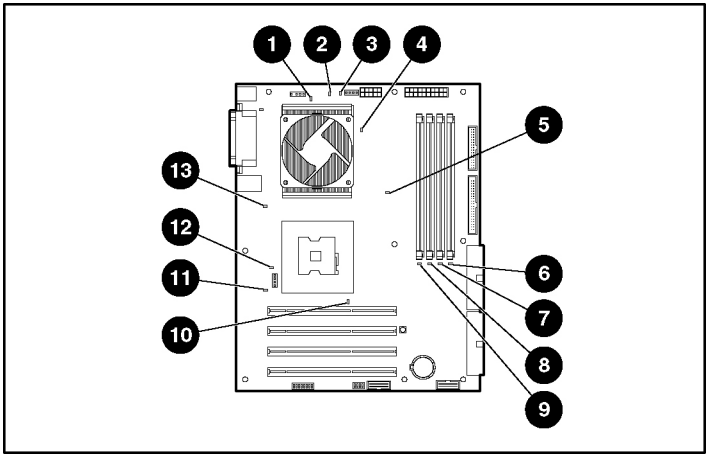


Table 1-8: System Board LEDs

Item	LED Description	Status
1	System fan failure	Amber = The system fan has failed or is not installed. Off = The system fan is functioning.
2	Processor 1 failure	Amber = Processor 1 has failed or is not installed. Off = Processor 1 is functioning.
3	Processor fan 1 failure	Amber = Processor fan 1 has failed or is not installed. Off = Processor fan 1 is functioning.
4	Processor power connector not installed	Amber = Power connector is not installed. Off = Power connector is installed.
5	Integrated PPM failure	Amber = The PPM has failed. Off = The PPM is functioning.

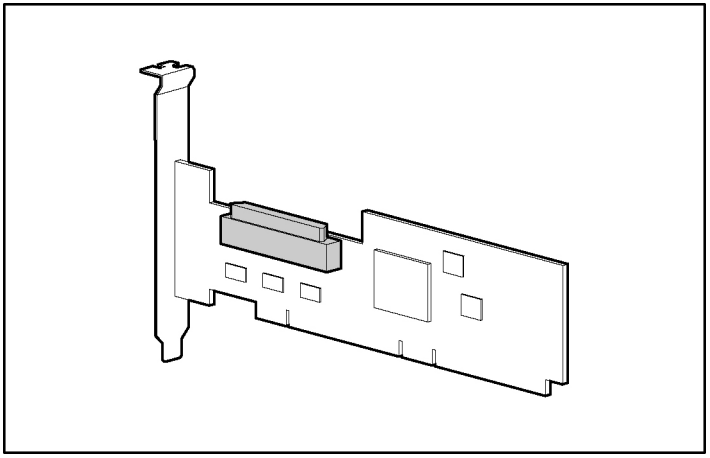
continued

Table 1-8: System Board LEDs *continued*

Item	LED Description	Status
6	DIMM 1 failure	Amber = The DIMM is failed.
7	DIMM 2 failure	Off = The DIMM is functioning.
8	DIMM 3 failure	
9	DIMM 4 failure	
10	Processor 2 failure	Amber = Processor 2 has failed or is missing. Off = Processor 2 is functioning.
11	System overtemperature	Amber = The temperature threshold has been exceeded. Off = The temperature is normal.
12	Processor fan 2 failure	Amber = Processor fan 2 has failed or is not installed. Off = Processor fan 2 is functioning.
13	AC power	Green = The power supply is attached to AC power. Off = The AC power cord is not connected to the power supply, the power supply connector is not attached to the system board, or the power supply has failed.

SCSI Controller Components

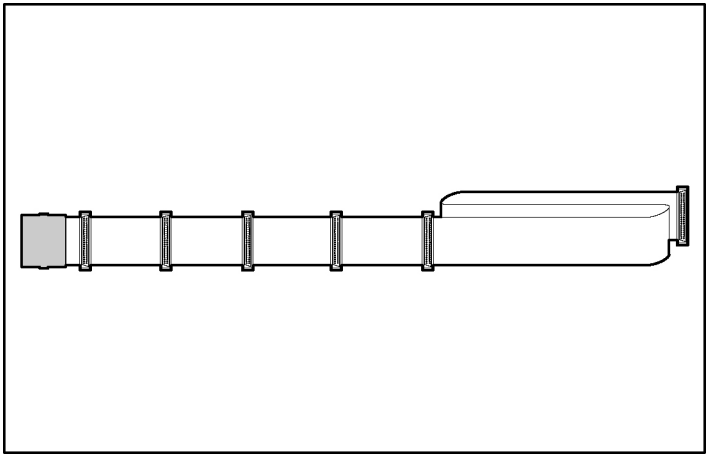
The SCSI controller has a single SCSI connector to support the internal SCSI bus.



SCSI Cable Components

Before performing SCSI cabling procedures, identify the SCSI cable components.

The SCSI cable supports up to five SCSI devices and comes with a terminator on the end. One cable is included with SCSI models of the server.



ATA Cable Components

Before performing ATA cabling procedures, identify the ATA cable components.

The type of ATA cable that ships with the server supports up to two ATA devices. Two cables are included with ATA models of the server.

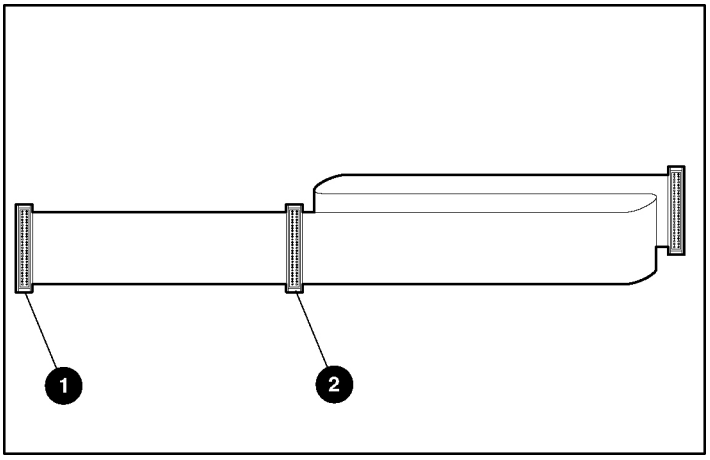


Table 1-9: ATA Cable Components

Item	Description
1	Device 0 (primary)
2	Device 1 (secondary)

2

Server Operations

Powering Up the Server

To power up the server, press the Power On/Standby button.

Powering Down the Server

WARNING: To reduce the risk of personal injury, electric shock, or damage to the equipment, remove the power cord to remove power from the server. The front panel Power On/Standby button does not completely shut off system power. Portions of the power supply and some internal circuitry remain active until AC power is removed.

To power down the server:

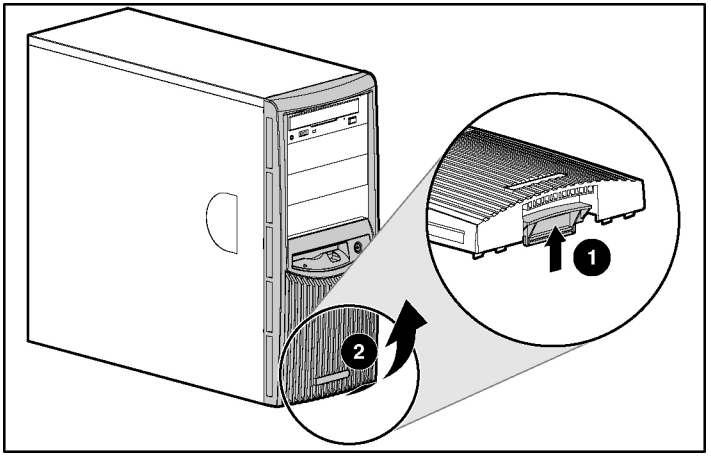
1. Back up the server data and record configuration information.
2. Shut down the operating system as directed in the operating system instructions.
3. Press the Power On/Standby button to place the server in standby mode. When the server acquires standby mode, the system power LED goes from flashing green to amber.
4. After the system power LED is amber, disconnect the power cord.
5. Disconnect any other external equipment from the server.

Removing the Front Bezel

CAUTION: To prevent equipment damage or data loss, be sure that the server is powered down, all cables are disconnected from the back of the server, and the power cord is disconnected from the grounded (earthed) AC outlet before removing the front bezel.

To remove the front bezel:

1. Power down the server. Refer to "Powering Down the Server" in this chapter.
2. Pull up on the bezel locking latch until it disengages.
3. Rotate the bezel upward and slide it away from the chassis. A small amount of force may be necessary to detach the bezel.



To replace the front bezel, reverse the removal procedure.

IMPORTANT: When replacing the front bezel, be sure to place the top hinge points in the chassis before rotating the front bezel downward to its original position.

Removing the Access Panel

WARNING: To reduce the risk of injury from hot surfaces, allow the drives and the internal system components to cool before touching them.

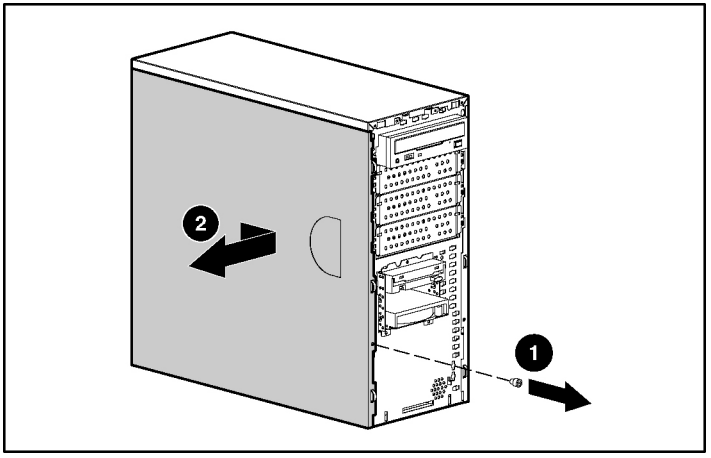
CAUTION: Do not operate the server for long periods without the access panel. Operating the server without the access panel results in improper airflow and improper cooling that can lead to thermal damage.

NOTE: The interior of the access panel contains labels with information about the server system board.

To remove the access panel:

1. Power down the server. Refer to "Powering Down the Server" in this chapter.
2. Remove the front bezel. Refer to "Removing the Front Bezel" in this chapter.

3. Remove the access panel:
   a. Remove the thumbscrew from the front left side of the chassis.
   b. Slide the access panel forward.
   c. Pull from the top of the access panel to remove it from the chassis.



To replace the access panel, reverse the removal procedure.

3

Server Setup

Optional Installation Services

You may choose to have HP install the system. The installation service can be purchased as a Carepack packaged service or as a customized service agreement to meet your specific requirements. Some of the Carepack services are as follows:

- Installation services for hardware
- Hardware and operating system installation for ProLiant servers
- Installation and start-up services for Microsoft® Windows® 2000 and Windows NT® operating systems
- Installation and start-up and migration services for Novell NetWare operating systems
- Installation and start-up services for Insight Manager

This optional hardware installation service is available in all countries where HP has a direct or indirect service presence. Service may be ordered from and directly provided by an HP authorized service reseller, or in the United States only, service may be ordered by calling 1-800-652-6672. In the United States, HP makes all of the arrangements to have the system installed by qualified guaranteed service providers. For more information, refer to the HP website (www.hp.com).

Tower Server Optimum Environment

When installing a tower model server, select a location that meets the following environmental standards:

- A sturdy, level site that includes dedicated and properly grounded (earthed) circuits, air conditioning, and ESD protection
- 7.6-cm (3.0-in) clearance on all sides of the tower server for proper ventilation
- A separate electrical circuit for the server

CAUTION: Protect the server from power fluctuations and temporary interruptions with a regulating uninterruptible power supply (UPS). This device protects the hardware from damage caused by power surges and voltage spikes and keeps the server in operation during a power failure.

To purchase a UPS, contact a local authorized reseller or refer to the HP website (www.hp.com/products/ups).

For detailed power and temperature requirements, refer to Appendix E, "Server Specifications."

Rack Server Optimum Environment

When installing the server in a rack, select a location that meets the environmental standards described in this section.

Space and Airflow Requirements

To allow for servicing and adequate airflow, observe the following spatial requirements when deciding where to install a rack:

- Leave a minimum clearance of 63.5 cm (25 in) in front of the rack.
- Leave a minimum clearance of 76.2 cm (30 in) behind the rack.
- Leave a minimum clearance of 121.9 cm (48 in) from the back of the rack to the back of another rack or row of racks.

HP servers draw in cool air through the front door and expel warm air through the rear door. Therefore, the front and rear rack doors must be adequately ventilated to allow ambient room air to enter the cabinet, and the rear door must be adequately ventilated to allow the warm air to escape from the cabinet.

CAUTION: To prevent improper cooling and damage to the equipment, do not block the ventilation openings.

When a vertical space in the rack is not filled by a server or rack component, the gaps between the components cause changes in airflow through the rack and across the servers. Cover all gaps with blanking panels to maintain proper airflow.

CAUTION: Always use blanking panels to fill empty vertical spaces in the rack. This arrangement ensures proper airflow. Using a rack without blanking panels results in improper cooling that can lead to thermal damage.

Compaq branded 9000 and 10000 Series racks provide proper server cooling from flow-through perforations in the front and rear doors that provide 64 percent open area for ventilation.

CAUTION: If an HP or third-party rack is used, observe the following additional requirements to ensure adequate airflow and to prevent damage to the equipment:

- Front and rear doors—If the 42U server rack includes closing front and rear doors, you must allow 5,350 sq cm (830 sq in) of holes evenly distributed from top to bottom to permit adequate airflow (equivalent to the required 64 percent open area for ventilation).
- Side—The clearance between the installed rack component and the side panels of the rack must be a minimum of 7 cm (2.75 in).

CAUTION: When using a Compaq branded 7000 Series rack, you must install the high airflow rack door insert [P/N 327281-B21 (42U) or P/N 157847-B21 (22U)] to provide proper front-to-back airflow and cooling.

Temperature Requirements

To ensure continued safe and reliable equipment operation, install or position the system in a well-ventilated, climate controlled environment.

The maximum recommended ambient operating temperature (TMRA) for most server products is 35°C (95°F). The temperature in the room where the rack is located must not exceed 35°C (95°F).

CAUTION: To reduce the risk of damage to the equipment when installing third-party options:

- Do not permit optional equipment to impede airflow around the server or to increase the internal rack temperature beyond the maximum allowable limits.
- Do not exceed the manufacturer's TMRA.

Power Requirements

Installation of this equipment must comply with local and regional electrical regulations governing the installation of information technology equipment by licensed electricians. This equipment is designed to operate in installations covered by NFPA 70, 1999 Edition (National Electric Code) and NFPA-75, 1992 (code for Protection of Electronic Computer/Data Processing Equipment). For electrical power ratings on options, refer to the product rating label or the user documentation supplied with that option.

WARNING: To reduce the risk of personal injury, fire, or damage to the equipment, do not overload the AC supply branch circuit that provides power to the rack. Consult the electrical authority having jurisdiction over your facility's wiring and installation requirements.

CAUTION: Protect the server from power fluctuations and temporary interruptions with a regulating uninterruptible power supply (UPS). This device protects the hardware from damage cause by power surges and voltage spikes and keeps the system in operation during a power failure.

When installing more than one server, you may need to use additional power distribution devices to safely provide power to all devices. Observe the following guidelines:

- Balance the server power load between available AC supply branch circuits.
- Do not allow the overall system AC current load to exceed 80 percent of the branch circuit AC current rating.
- Do not use common power outlet strips for this equipment.
- Provide a separate electrical circuit for the server.

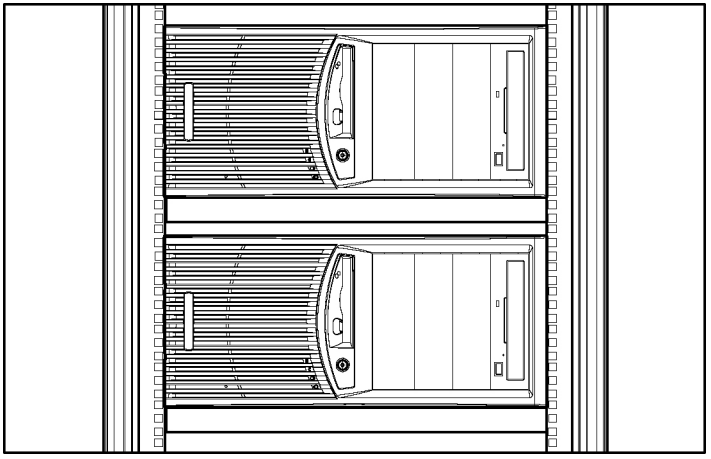
Electrical Grounding Requirements

The server must be grounded properly for proper operation and safety. In the United States, you must install the equipment in accordance with NFPA 70, 1999 Edition (National Electric Code), Article 250, as well as any local and regional building codes. In Canada, you must install the equipment in accordance with Canadian Standards Association, CSA C22.1, Canadian Electrical Code. In all other countries, you must install the equipment in accordance with any regional or national electrical wiring codes, such as the International Electrotechnical Commission (IEC) Code 364, parts 1 through 7. Further more, you must be sure that all power distribution devices used in the installation, such as branch wiring and receptacles, are listed or certified grounding-type devices.

Because of the high ground-leakage currents associated with multiple servers connected to the same power source, HP recommends the use of a power distribution unit (PDU) that is either permanently wired to the building's branch circuit or includes a nondetachable cord that is wired to an industrial-style plug. NEMA locking-style plugs or those complying with IEC 60309 are considered suitable for this purpose. Using common power outlet strips for the server is not recommended.

Installing the Rack Server

The server offers optional support for HP, Compaq branded, and some third-party rack solutions.



To purchase the rack-enabling kit, contact the local authorized reseller or refer to the HP website (www.compaq.com/products/servers/proliantml330/index.html).

A selection of racks for the server can be purchased through authorized resellers or the HP website (www.hp.com/products/serverstorage).

For additional information and instructions on installing the server into a rack, refer to the rack-enabling kit documentation.

Identifying the Server Shipping Carton Contents

Unpack the server shipping carton and locate the materials and documentation necessary for installing the server:

- Keyboard
- Mouse
- Power cord
- ProLiant Essentials Foundation Pack, which includes the documentation and software

In addition to these supplied items, you may need the following:

- Torx T-10 screwdriver
- Torx T-15 screwdriver
- Phillips No. 2 screwdriver
- Hardware options
- Uninterruptible power supply (UPS)
- Ethernet cable
- Monitor
- Application software

Installing a Server

Before beginning any installation or configuration procedures, do one of the following:

- If the server has a factory-installed operating system, prevent data loss by configuring the server using the proper instructions. Refer to "Server with a Factory-Installed OS" in this chapter.
- If the operating system was not factory-installed, follow the proper instructions. Refer to "Server with an OS Purchased Separately" in this chapter.

Server with a Factory-Installed OS

To install the server:

1. Be sure that the server location meets the required environmental standards. Refer to "Tower Server Optimum Environment" in this chapter.
2. Connect any peripheral devices to the rear panel connectors. For the location of rear panel connectors, refer to Chapter 1, "Component Identification."

WARNING: To reduce the risk of electric shock or fire, do not plug telecommunications/telephone connectors into the network interface controller (NIC) receptacle.

3. Connect the power cord to the AC power connector on the server rear panel.
4. Press the Power On/Standby button.
5. Follow the on-screen instructions to complete the factory-installed operating system initialization process. After initialization is complete, the server automatically goes through Power-On Self-Test (POST).

   IMPORTANT: If you change the RAID level, you must re-install the operating system. For more information on configuring arrays, refer to Chapter 6, "RAID Configuration and Management."

6. Install Insight Manager to manage the server. The software is located on the Management CD. For Management CD initialization procedures, refer to the ProLiant Essentials Foundation Pack that ships with the server.

   IMPORTANT: To benefit from the Pre-Failure Warranty on processors, hard drives, and memory modules, you must install and use Insight Manager.

7. After verifying the server configuration, back up the system configuration. For more information, refer to the **System Configuration Utility** menu on the SmartStart CD.
8. Install any additional hardware. Refer to the documentation that ships with the option or refer to Chapter 4, "Hardware Options Installation."
9. Install any application software.

Server with an OS Purchased Separately

To operate properly, the server must have a supported operating system. For the latest information on supported operating systems, refer to the HP website (www.hp.com).

If you purchased the operating system separately, HP recommends that you install it with the SmartStart CD. Refer to the ProLiant Essentials Foundation Pack for instructions on using SmartStart. The first time the server is configured, the SmartStart program automatically creates a necessary partition on the hard drive. This partition cannot be used for any other purpose and is not a traditional system partition.

To install the operating system for the first time:

1. Be sure that the server location meets the required environmental standards. Refer to "Tower Server Optimum Environment" in this chapter.
2. Install any hardware options. Refer to the documentation that ships with the option or refer to Chapter 4, "Hardware Options Installation."
3. Connect any peripheral devices to the rear panel connectors. For the location of rear panel connectors, refer to Chapter 1, "Component Identification."

WARNING: To reduce the risk of electric shock or fire, do not plug telecommunications/telephone connectors into the network interface controller (NIC) receptacle.

4. Connect the power cord to the AC power connector on the server rear panel.
5. Press the Power On/Standby button.
6. Before selecting the operating system, press the **F8** key during POST if you are using an ATA model to configure RAID array. The default configuration is RAID 0.

IMPORTANT: To avoid automatic RAID 0 configuration in ATA models, you must configure an array before OS installation. If you change the RAID level, you must re-install the operating system. For more information on configuring arrays, refer to Chapter 6, "RAID Configuration and Management."

7. To select the type of operating system and set the date and time, run ROM-Based Setup Utility (RBSU) by pressing the **F9** key when prompted during initial boot.

   For more information on RBSU, refer to Chapter 5, "Server Configuration and Utilities," or refer to the *HP ROM-Based Setup Utility User Guide*.

8. Insert the SmartStart CD into the CD-ROM drive and configure the server:
   - — For configuration procedures, refer to "Configuring the Server" in this chapter.
   - — For SmartStart CD initialization procedures, refer to Chapter 5, "Server Configuration and Utilities" or the ProLiant Essentials Foundation Pack that ships with the server.

9. Install the operating system software.
10. Install Insight Manager to manage the server. The software is located on the Management CD. For Management CD initialization procedures, refer to the ProLiant Essentials Foundation Pack that ships with the server.

    IMPORTANT: To benefit from the Pre-Failure Warranty on processors, hard drives, and memory modules, you must install and use Insight Manager.

11. Install any application software.

Configuring the Server

RBSU, the server setup utility, can be used to configure the server and options. To initiate RBSU, press the **F9** key when prompted during start up.

The SmartStart CD contains ROMPaq and updated drivers and assists with the operating system installation.

To use the SmartStart CD:

1. Locate the SmartStart CD in the ProLiant Essentials Foundation Pack.
2. Power up the server. Refer to "Powering Up the Server" in Chapter 2, "Server Operations."
3. Press the CD-ROM drive eject button. For button locations, refer to "Front Panel Components" in Chapter 1, "Component Identification."

4. With the labeled side up, insert the SmartStart CD into the CD-ROM drive.

   When the activity LED on the CD-ROM illuminates green, the SmartStart sequence begins. For more information, refer to the SmartStart CD.

Registering the Server

Register the server by completing the forms included with the server or refer to the HP website (register.hp.com).

4

Hardware Options Installation

If more than one option is being installed, read the installation instructions for all the hardware options and identify similar steps to streamline the installation process.

WARNING: To reduce the risk of personal injury from hot surfaces, allow the drives and the internal system components to cool before touching them.

CAUTION: To prevent damage to electric components, properly ground the server before beginning any installation procedure. Improper grounding can cause electrostatic discharge.

Preparation Procedures

To install internal hardware options, you must do the following:

1. Power down the server. Refer to "Powering Down the Server" in Chapter 2, "Server Operations."
2. Remove the front bezel. Refer to "Removing the Front Bezel" in Chapter 2, "Server Operations."
3. Remove the access panel. Refer to "Removing the Access Panel" in Chapter 2, "Server Operations."

Processor Option

The server supports single- and dual-processor operation. However, if a processor fails, the system automatically boots from the other processor and provides a processor failure message.

Observe the following requirements before installing a processor in the server:

- Processor socket 1 must always be populated. If the processor is missing from socket 1, the system attempts to boot but displays an error message during POST.
- If processors of differing speeds are installed, each processor operates at the speed of the slowest processor.
- When upgrading a processor to a higher speed, no switch changes are needed on the system board. The system ROM automatically sets the processor frequency during POST.

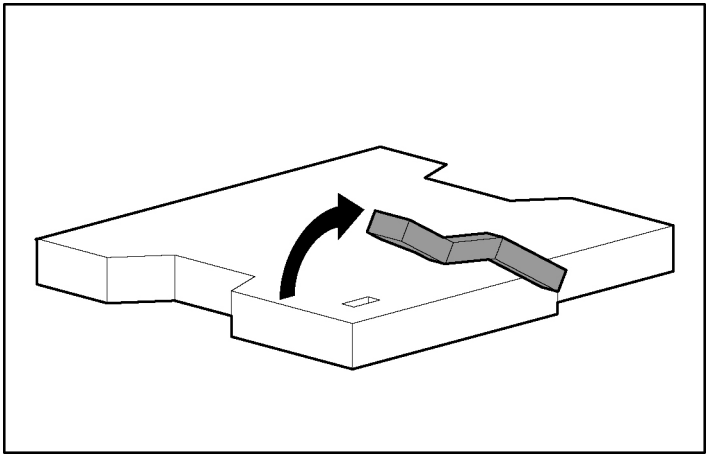
To install a processor:

1. Complete the "Preparation Procedures" in this chapter.
2. Be sure that the server has the most current ROM version. To update the ROM, visit the HP website (www.compaq.com/support/files/server/us/).

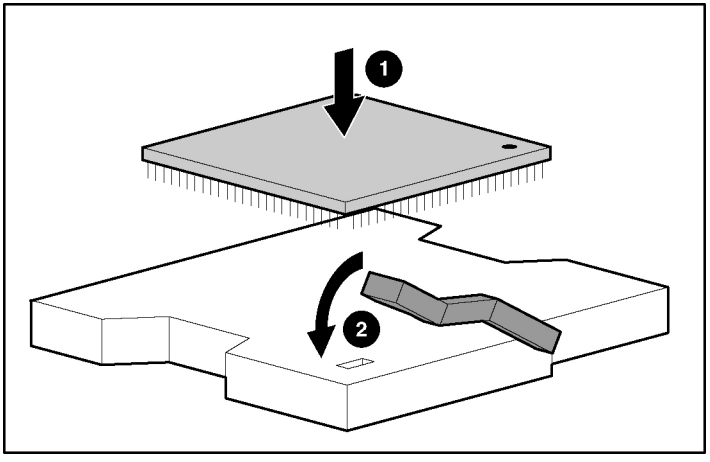
CAUTION: Failure to flash the ROM before installing processors can cause system failure.

3. Place the server on the right side, so the open side faces up.
4. Locate the processor socket. Refer to Chapter 1, "Component Identification."

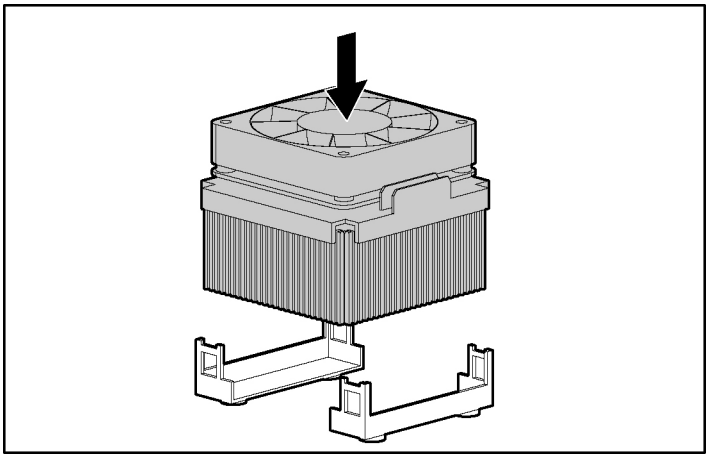
5. Raise the processor socket lever.



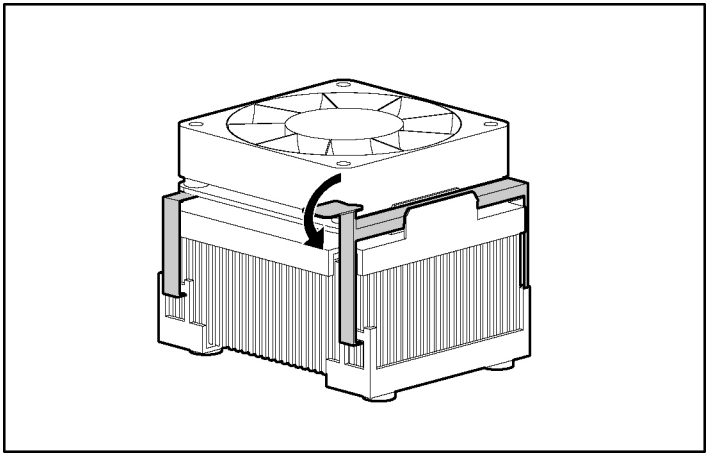
6. Install the processor:
   a. Place the processor into the socket.
   b. Lower the processor socket lever. The guide posts and directional key marks on the socket must be aligned with the corresponding slots and marks on the processor.



7. Align the heatsink assembly so that the processor fan cable can reach the processor fan connector on the system board.
8. Install the heatsink assembly on the processor.



9. Close the retaining clips on both sides of the heatsink to secure the assembly.



10. Connect the processor fan to the processor fan connector on the system board.
11. Install the access panel. Refer to Chapter 2, "Server Operations."
12. Install the front bezel. Refer to Chapter 2, "Server Operations."

DIMMs

The server comes standard with one ECC Registered PC2100 DDR SDRAM DIMM. Additional DIMMs are available to upgrade the memory up to 4 GB. The server has four DIMM sockets located on the system board.

When installing DIMMs, observe the following guidelines:

- Memory modules must be industry-standard, ECC Registered PC2100 DDR SDRAM DIMM and support CAS Latency 2.5 (CL=2.5).
- Do not mix ECC and non-ECC SDRAM DIMMs. If different types of DIMMs are mixed, the server will not properly function.
- The server supports 128-MB, 256-MB, 512-MB, and 1-GB DIMMs.
- Install DIMMs one at a time, sequentially, in DIMM slots 1 through 4.

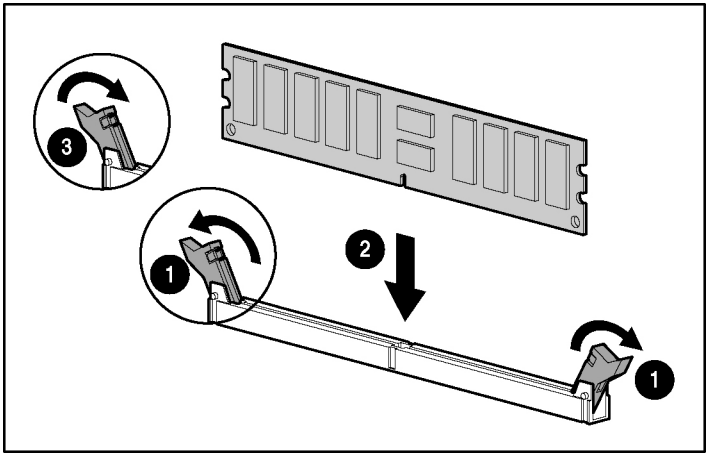
To install a DIMM:

1. Complete the "Preparation Procedures" in this chapter.

2. Install the DIMM:
   a. Open the DIMM slot latches.

CAUTION: A DIMM can be installed only one way or damage will result. Be sure to match the key slot on the DIMM with the tab on the DIMM socket. Push the DIMM down into the socket, ensuring that it is fully inserted and properly seated.

   b. Insert the DIMM into the slot.
   c. Close the DIMM slot latches.



NOTE: The latches may close automatically when the DIMM is properly inserted.

3. Install the access panel. Refer to Chapter 2, "Server Operations."
4. Install the front bezel. Refer to Chapter 2, "Server Operations."

Storage Devices

The server ships standard with four removable media bays. The top 5.25-in bay is occupied by an IDE CD-ROM drive. The remaining three 5.25-in bays are available for removable media devices. You can install three half-height devices, or one full-height device and one half-height device, into these bays.

Use the procedures in this section to install storage devices supported by the server.

IMPORTANT: When you add or remove a component or change a security feature, you must reconfigure the server to recognize these changes. If the system configuration is incorrect, the server does not work properly and you may receive error messages on the screen.

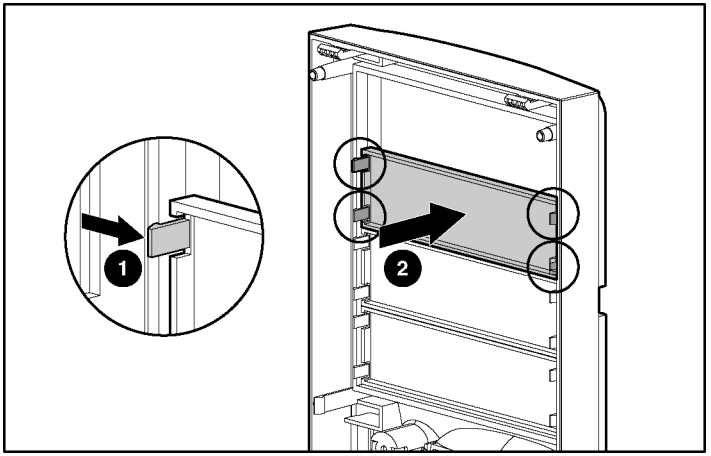
Removing Bezel Blanks

When installing a device other than a hard drive into a removable media bay, you must remove the corresponding bezel blank from the front bezel.

To remove a bezel blank:

1. Power down the server. Refer to "Powering Down the Server" in Chapter 2, "Server Operations."
2. Remove the Front Bezel. Refer to "Removing the Front Bezel" in Chapter 2, "Server Operations."

3. Remove the bezel blank:
   a. On the back of the front bezel, press the tabs on each end of the bezel blank toward each other.
   b. Push the bezel blank through the front bezel.



To install a bezel blank, reverse the removal procedure.

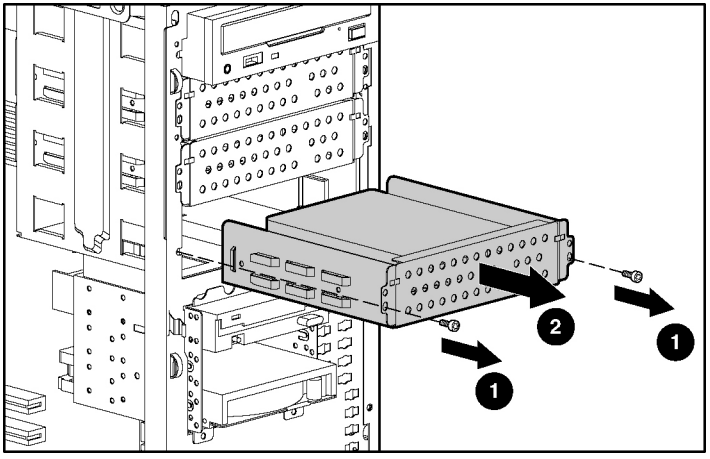
Removing a Media Bay Drive Tray

NOTE: The drive trays in the removable media bays can be used to mount internal 3.5-inch devices. The rails mounted inside the drive trays can be removed and used to mount other devices in the removable media bays.

When installing a device into a removable media bay, you must first remove the drive tray.

To remove a media bay drive tray:

1. Complete the "Preparation Procedures" in this chapter.
2. Remove the drive tray:
   a. Remove the screws that secure the drive tray on each side.
   b. Gently slide the drive tray out of the chassis.

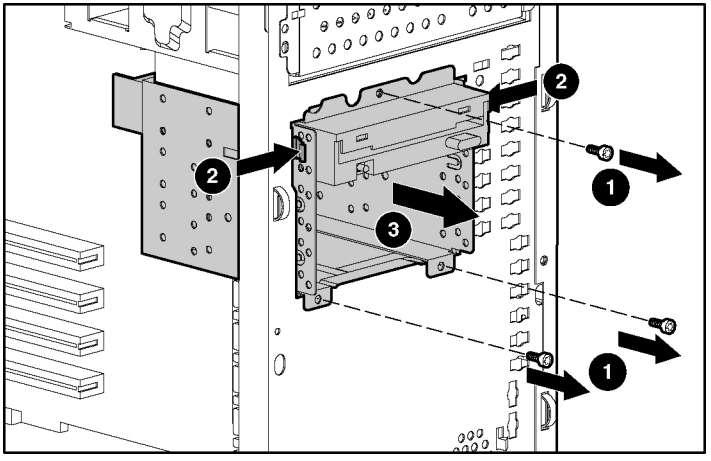


To install a drive tray, reverse the removal procedure.

Installing a Hard Drive into a Hard Drive Bay

To install a 3.5-in hard drive into a hard drive bay:

1. Complete the "Preparation Procedures" in this chapter.
2. Disconnect the power and data cables from the back of all devices located in the hard drive compartment.
3. Remove the drive compartment:
   a. Remove the three shipping screws.
   b. Press the tabs on each side of the drive compartment.
   c. Pull the drive compartment out of the chassis.



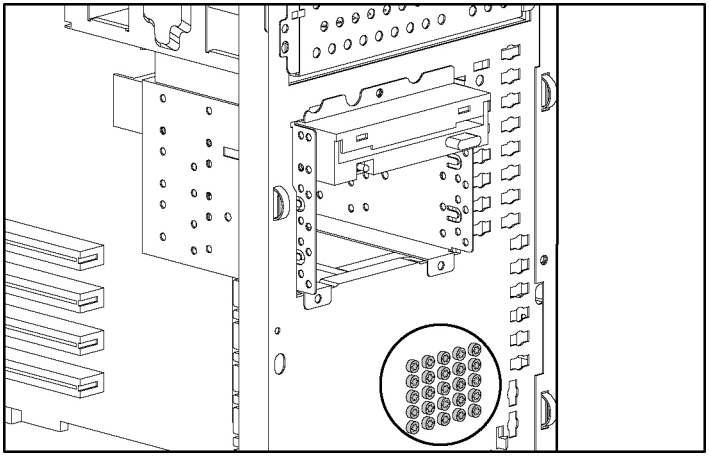
4. Configure the device:
   — For SCSI devices, set the SCSI ID on the drive. You must manually set the SCSI ID on each device to a unique value in the range of 0 to 6 for each SCSI bus. Refer to the documentation provided with the device for instructions on how to set the SCSI ID.
   — For ATA devices, be sure that the jumper on the drive is set to Cable Select (CS) so that the drive device ID is determined by the cable. For more information, refer to "Cabling a Hard Drive" in this chapter.

NOTE: If you have two drives, connect one on each ATA channel. The performance of the array is enhanced with one drive per channel.

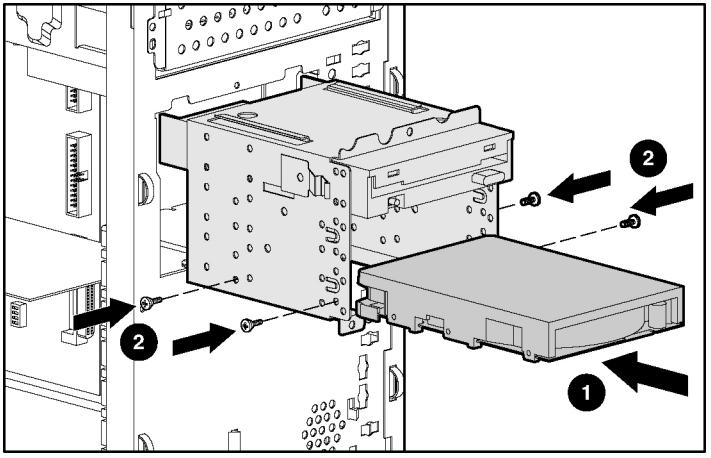
5. If applicable, remove all terminating jumpers from third-party SCSI devices (HP SCSI cables are terminated).

NOTE: Using a non-LVD (single-ended) SCSI device affects the SCSI bus performance of the server. Any SCSI devices that are Wide-Ultra or older are single-ended.

6. Locate the hard drive screws on the front of the chassis.



7. Install the hard drive:
   a. Slide the drive into the drive bay.
   b. Secure the drive with two screws on each side of the drive compartment.

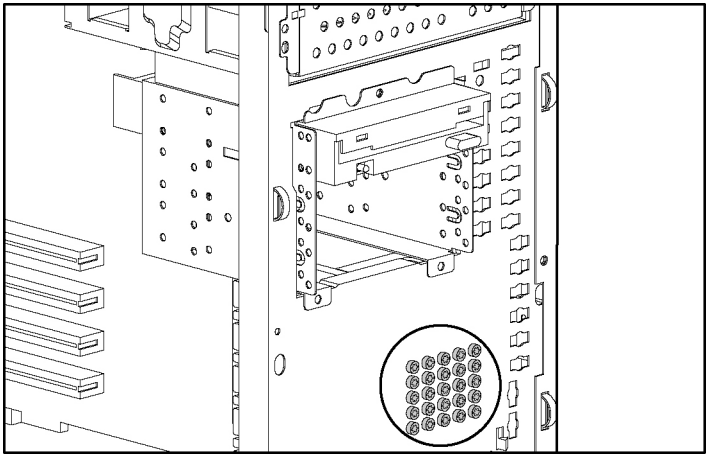


8. Slide the drive compartment back into the chassis, and then install the three shipping screws removed in step 3.
9. Connect the data and power cables to the back of all devices. For specific cabling information, refer to "Cabling a Hard Drive" in this chapter.
10. Install the access panel and the front bezel. Refer to Chapter 2, "Server Operations."

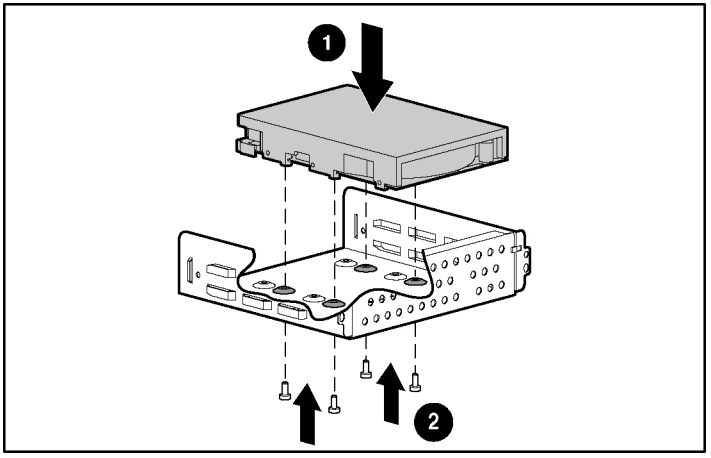
Installing a Hard Drive into a Removable Media Bay

To install a hard drive using a drive tray:

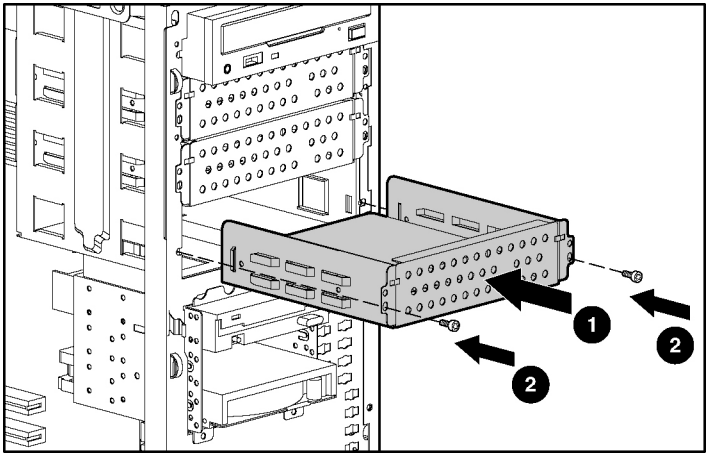
1. Complete the "Preparation Procedures" in this chapter.
2. Configure the device:
   - For SCSI devices, set the SCSI ID on the drive. You must manually set the SCSI ID on each device to a unique value in the range of 0 to 6 for each SCSI bus. Refer to the documentation provided with the device for instructions on how to set the SCSI ID.
   - For IDE (ATAPI or ATA) devices, be sure that the jumper on the drive is set to Cable Select (CS) so that the drive device ID is determined by the cable. For more information, refer to "Cabling a Hard Drive" in this chapter.
3. Locate the hard drive screws on the front of the chassis.



4. Install the hard drive:
   a. Set the drive into the drive tray.
   b. Secure the drive with four screws on the bottom of the drive tray.



5. Install the drive tray:
   a. Slide the drive tray into the removable media bay.
   b. Secure the drive tray with a screw on each side.



6. Connect the data and power cables to the back of all devices. For specific cabling information, refer to "Cabling a Hard Drive" in this chapter.
7. Install the access panel and the front bezel.

Cabling a Hard Drive

SCSI Cabling

Observe the following guidelines when adding SCSI devices to the server:

- As a general rule, a maximum of seven devices may be added per channel. The server is equipped with one integrated Wide Ultra3 SCSI channel.
- Be sure to remove all terminating jumpers from third-party SCSI devices.
- You must manually set the SCSI ID on each device to a unique value in the range of 0 through 6 for each SCSI bus. Refer to the documentation provided with the device for instructions on how to set the SCSI ID.

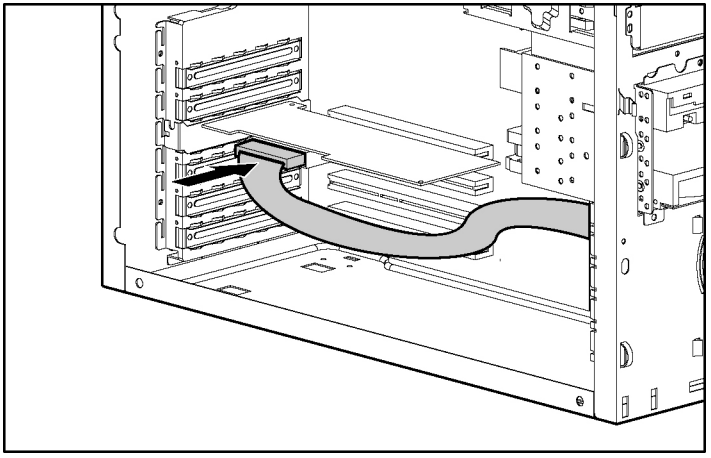
To cable a SCSI device or hard drive:

1. Complete the hardware installation procedure.
2. Connect the end of the SCSI cable to one of the following:
   - SCSI connector on the SCSI controller
   - SCSI connector on an optional array controller

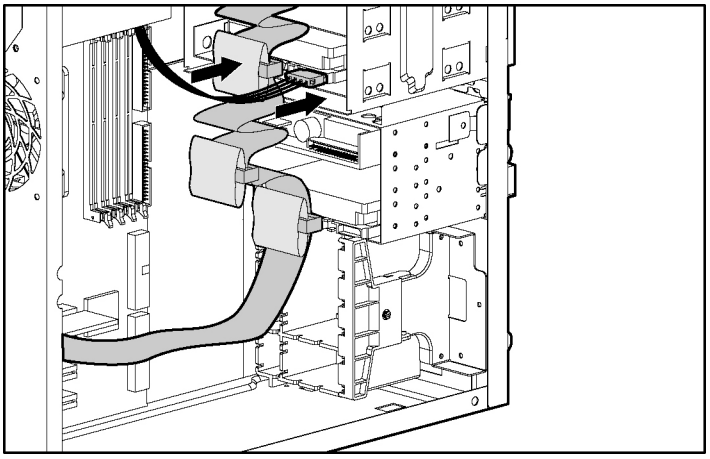
IMPORTANT: For more array controller cabling information, refer to the documentation that ships with the option.

IMPORTANT: HP recommends connecting any non-LVD (single-ended) tape drives or SCSI devices to a separate SCSI cable to avoid a decrease in Ultra2 or Ultra 3 SCSI device performance. A separate SCSI expansion board should be installed to accommodate single-ended drives (drives which are not Ultra2, Ultra 3, or greater).

NOTE: The SCSI controller only operates in expansion slot 1.



3. Connect the next available SCSI cable connector to the hard drive or SCSI device.
4. Connect the next available power cable connector to the hard drive or SCSI device.



ATA Cabling

Observe the following guidelines when adding ATA hard drives to the server:

- A maximum of two hard drives may be added per channel. The server is equipped with two integrated ATA/100 RAID channels.
- Jumpers on ATA devices should be set to Cable Select (CS), enabling primary and secondary devices to be determined by the cable.
- Connect ATA hard drives only to the Integrated ATA/100 RAID controller channels. Do not connect other peripherals to the Integrated ATA/100 RAID controller channels.

To cable an ATA hard drive:

1. Complete the hardware installation procedure.
2. Connect the end of the ATA cable to the system board.

3. Connect the next available ATA cable connector to the hard drive. Use the following cable sequence.

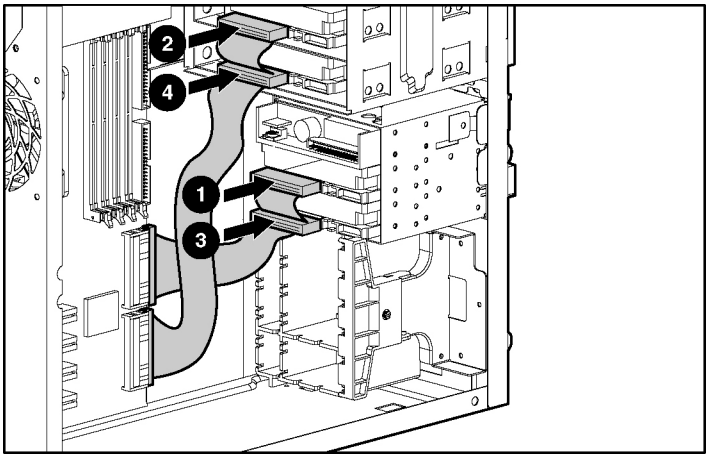


Table 4-1: ATA Cabling Sequence

Connection Order	System Board Connector	Cable Connector	Drive Location
1	ATA/100 RAID primary controller	Device 0	Hard drive bay 2
2	ATA/100 RAID secondary controller	Device 0	Media bay 3
3	ATA/100 RAID primary controller	Device 1	Hard drive bay 3
4	ATA/100 RAID secondary controller	Device 1	Media bay 4

Note: For drive bay locations, refer to Chapter 1, "Component Identification."

4. Connect the next available power cable connector to the hard drive.

For more information about connecting ATA cables, refer to "Drive Connection Tips" in Chapter 6, "RAID Configuration and Management."

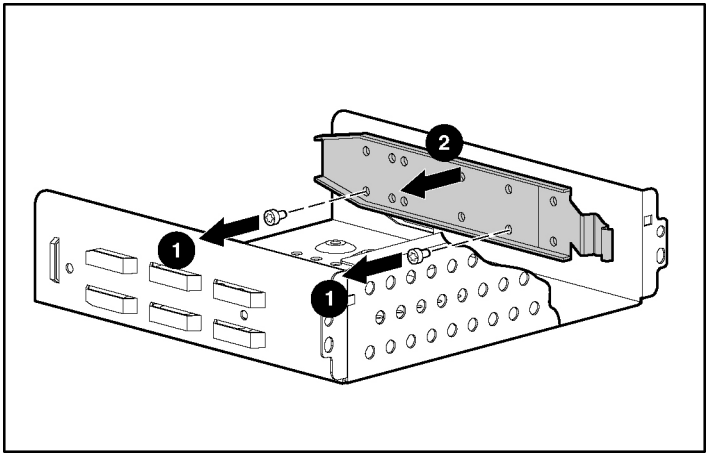
Installing a Tape Drive or Other Removable Media Device

To install a tape drive:

1. Complete the "Preparation Procedures" in this chapter.
2. Configure the device:
   - For SCSI devices, set the SCSI ID on the drive. You must manually set the SCSI ID on each device to a unique value in the range of 0 to 6 for each SCSI bus. Refer to the documentation provided with the device for instructions on how to set the SCSI ID.
   - For IDE (ATAPI or ATA) devices, be sure that the jumper on the drive is set to Cable Select (CS) so that the drive device ID is determined by the cable. For more information, refer to "Cabling a Hard Drive" in this chapter.

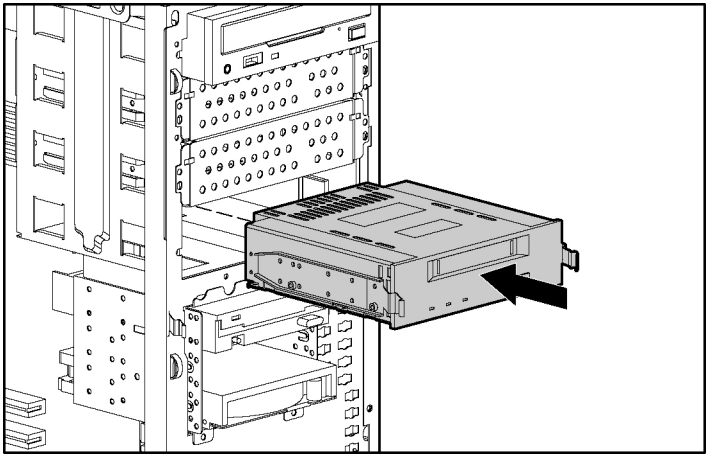
   NOTE: When installing an ATAPI tape drive, refer to "Cabling an ATAPI Tape Drive" in Chapter 5, "Server Cabling."
3. Remove the drive tray. Refer to "Removing a Media Bay Drive Tray" in this section.

4. Remove the rails from the drive tray:
   a. Use a Torx T-15 tool to remove the guide screws.
   b. Remove the rails from a removable media bay blank.



5. Install the rails on the tape drive.

6. Slide the tape drive into the removable media bay.



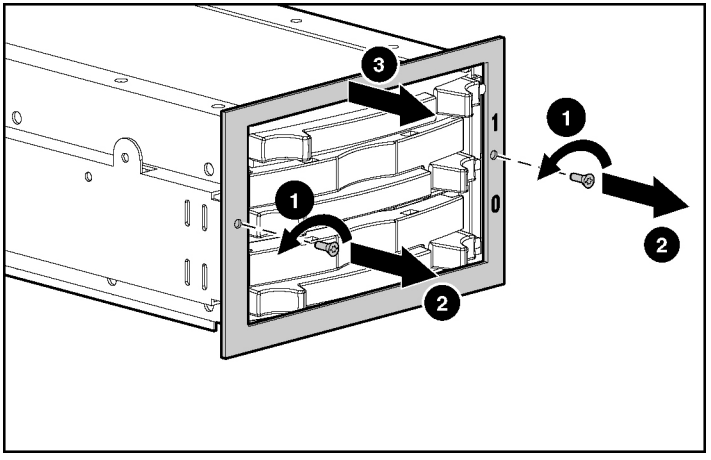
7. Connect the end of the existing ATA cable to the IDE (ATAPI) connector on the system board. For the IDE connector location, refer to Chapter 1, "Component Identification."
8. Connect the cable connector labeled Device 1 to the tape drive.
9. Connect the cable connector labeled Device 0 to the CD-ROM drive.
10. Connect the next available power cable connector to the hard drive.
11. Install the access panel and the front bezel. Refer to Chapter 2, "Server Operations."

Installing a Two-Bay Hot-Plug SCSI Drive Cage

NOTE: For additional information about the two-bay hot-plug SCSI drive cage, refer to the *HP Internal Two-Bay Hot-Plug SCSI Drive Cage Installation Instructions*.

To install the two-bay hot-plug SCSI drive cage:

1. Complete the "Preparation Procedures" in this chapter.
2. Remove the bezel that ships attached to the drive cage:
   a. Use a Torx T-10 tool to loosen the two screws.
   b. Remove the screws from the bezel.
   c. Remove the bezel from the drive cage.

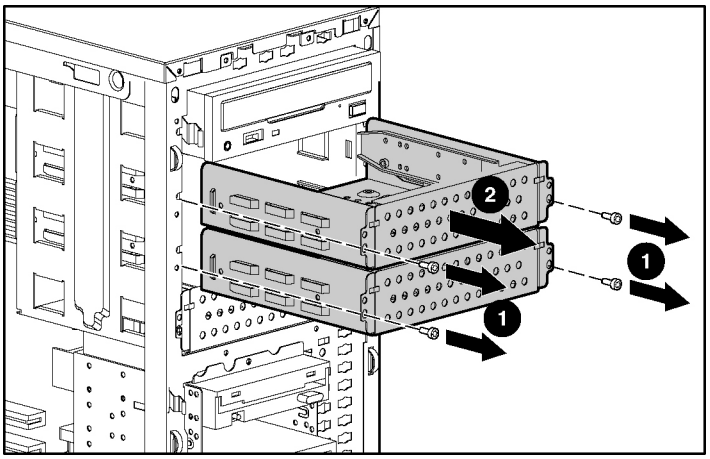


IMPORTANT: Be sure that the unit identification numbers (0 and 1) appear on the right side of the drive cage front panel. For identification purposes, the number 2 appears on the back of the bezel shipped with the option kit.

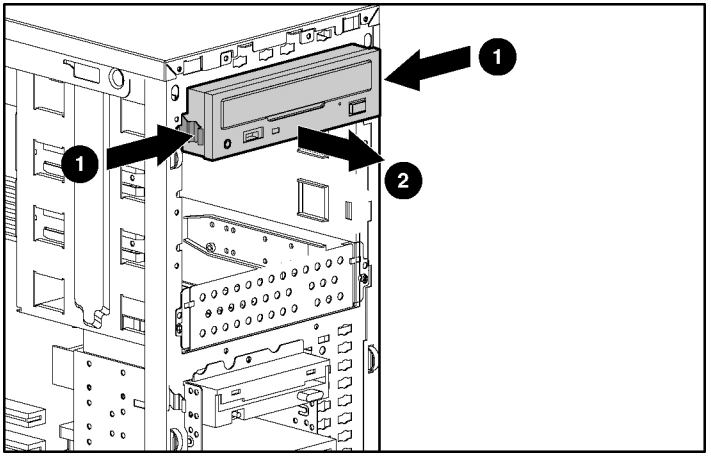
3. Reverse the actions in step 1 to install the smaller bezel from the option kit on the drive cage.

IMPORTANT: The drive cage can be installed only in the top two bays.

4. Remove the media bay blanks from media bays 2 and 3:
   a. Remove the screws from the blanks.
   b. Remove the blanks from the bays.

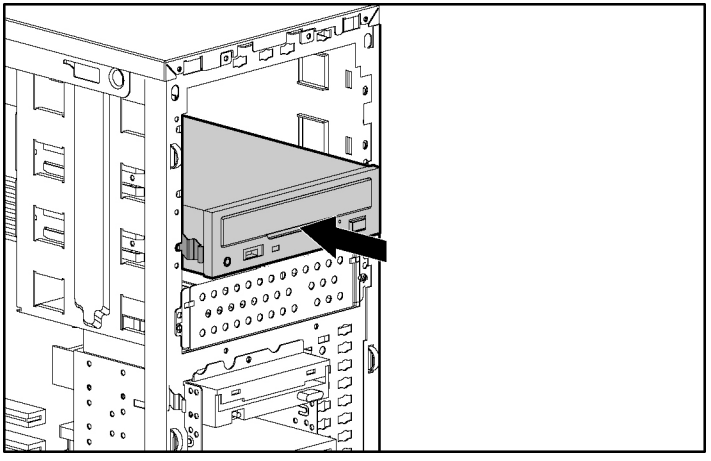


5. Remove the CD-ROM from media bay 1:
   a. Press the release latches on the CD-ROM drive.
   b. Remove the CD-ROM drive from the media bay.



6. Install the CD-ROM drive in media bay 3.

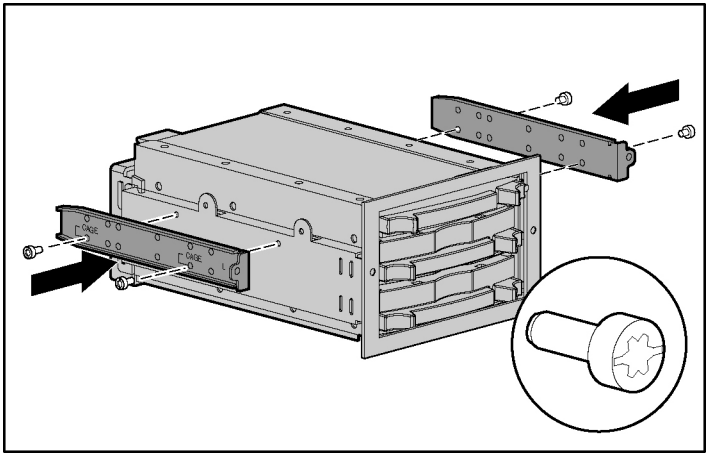
CAUTION: Use care when sliding the CD-ROM drive into the bay. Excess force can damage the system board.



IMPORTANT: To install the rails on the drive cage, always use the screws that ship with the two-bay hot-plug SCSI drive cage option kit.

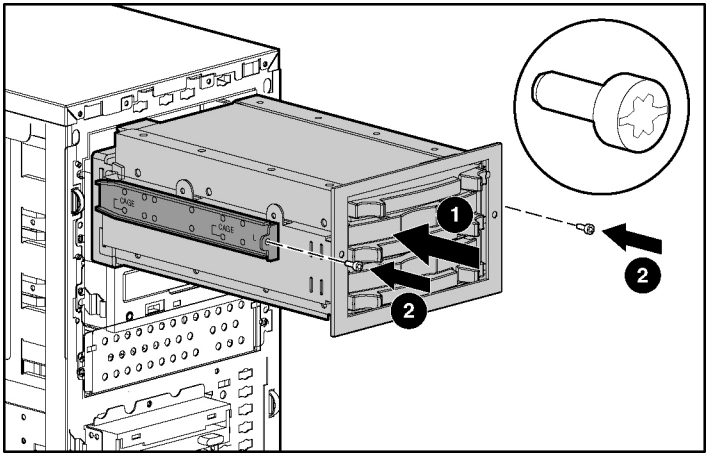
IMPORTANT: Install the right-hand rail on the left side of the drive cage, and the left-hand rail on the right side of the drive cage.

7. Install the rails:
   a. Position the rails and two guide screws in the **lower** mounting holes on each side of the drive cage.
   b. Tighten the screws.

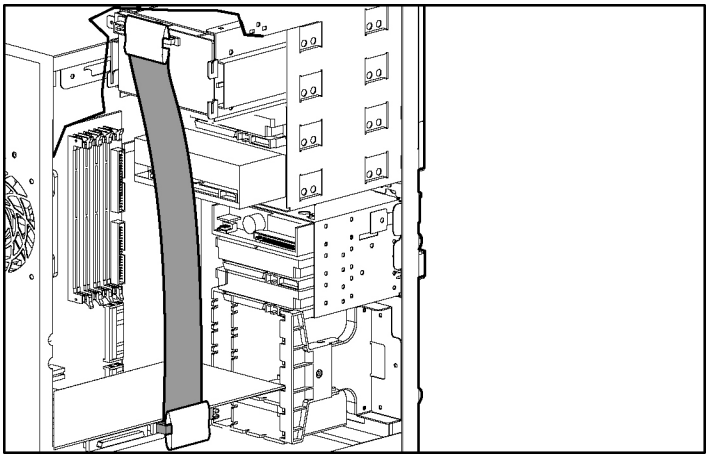


IMPORTANT: Always use the SCSI cable that ships with the drive cage option kit. Other available SCSI cables may not support Ultra3 SCSI.

8. Connect the SCSI cable that ships with the optional drive cage to the SCSI connector on the back of the drive cage.
9. Thread the SCSI cable through the media bay.
10. Locate the power cable inside the server and connect it to the power connector on the back of the drive cage.
11. Install the drive cage:
    a. Slide the drive cage into the removable media bay until it locks into place.
    b. Screw the ends of the rails into the chassis on both sides.



12. Connect the other end of the SCSI cable to the SCSI connector on the SCSI controller or optional array controller.



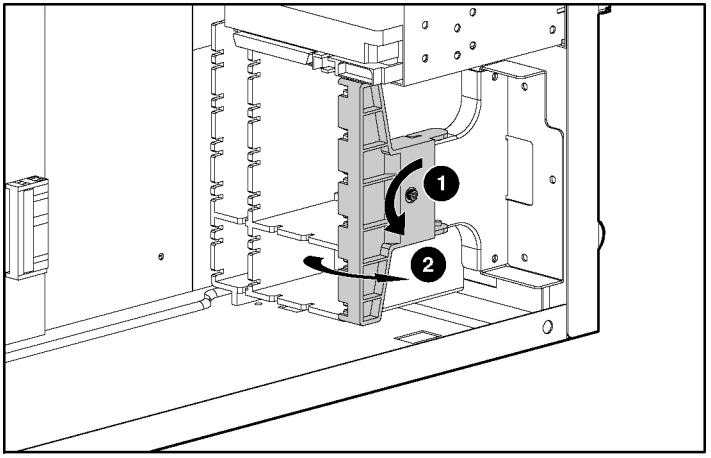
For additional information, refer to the *HP Internal Two-Bay Hot-Plug SCSI Drive Cage Installation Instructions*.

Expansion Boards

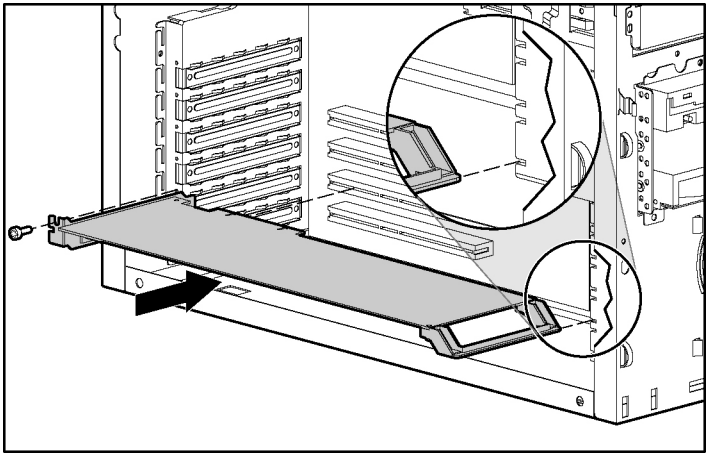
To install an expansion board:

1. Complete the "Preparation Procedures" in this chapter.
2. From inside the chassis, push the expansion slot cover through the rear of the chassis.
3. Depending on the length of the expansion card, do one of the following:
   - If the card is full-length, go to step 4.
   - If the card is half-length, go to step 5.

4. Release the expansion board retainer:
   a. Loosen the screw.
   b. Turn the retainer back towards the front of the chassis.



5. Install the expansion board:
   a. Insert the expansion board into the slot.
   b. Secure the board with a screw.



6. Connect any cables to the expansion board.
7. For a full-length expansion board, install the expansion board retainer. Reverse the actions in step 4.
8. Install the access panel and front bezel. Refer to Chapter 2, "Server Operations."

To remove an expansion board, reverse the installation procedure.

5

Server Configuration and Utilities

ROM-Based Setup Utility

RBSU performs a wide range of configuration activities, including the following:

- Configuring server devices and installed options
- Viewing server information
- Selecting the operating system
- Selecting the primary boot controller

In addition, RBSU includes other features, which are outlined in "Using RBSU" in this chapter.

For information on RBSU not found in this guide, refer to the *HP ROM-Based Setup Utility User Guide* found in the ProLiant Essentials Foundation Pack.

Navigating RBSU

To make selections within RBSU, use the following keys:

- Access RBSU by pressing the **F9** key when prompted during startup.
- Use the arrow keys navigate through the menu system.
- Make selections by pressing the **Enter** key.

- Cancel selections by pressing the **Escape** key.
- Save selections and changes by pressing the **F10** key.

Using RBSU

NOTE: Most of the features in RBSU are not required in the setup of the server. The options in this utility are designed to assist with specific server configuration issues.

RBSU is separated into a series of menu selections designed to configure specific areas of the server. The primary menus are as follows:

- System Options
- PCI Devices
- Standard Boot Order (IPL)
- Boot Controller Order
- Date and Time
- Automatic Server Recovery (ASR)
- Server Passwords
- Server Asset Text
- Advanced Options
- BIOS Serial Console
- Utility Language

System Options

The **System Options** menu configures the basic input/output (I/O) of the server and sets the operating system. The configuration options include the operating system, the external ports, and the ability to control the diskette drive. The following is a list of selections found on this menu with an explanation of each option:

- **OS Selection** selects the primary operating system for the server. Default server settings are automatically set based on the operating system selected.
- **Serial Number** allows you to change the serial number, though HP does not recommend changing it.
- **Embedded COM Port *X*** sets the configuration for the internal serial port A or B. The configuration options include the address and interrupt request (IRQ). This option can also disable the port.
- **Integrated Diskette Controller** enables or disables the diskette drive. When disabled, **Diskette Write Control**, **Diskette Boot Control**, and **IPL Boot Order** are irrelevant.
- **Embedded NIC Port 1 PXE Support** enables the Pre-boot Execution Environment (PXE) support for NIC Port 1. The **Embedded NIC Port PXE Support** option allows the server to boot to the network and attach to a PXE server with boot images. When enabled, the NIC port is displayed in the **Initial Program Loader** (IPL) list.
- **Diskette Write Control** allows you to configure the write control of the diskette drive. It can be set to read and write or to read only.
- **Diskette Boot Control** enables you to have the server boot from the removable media device.
- **Embedded LPT Port** allows you to enable the embedded LPT Port at the specified resource settings or to disable the option.
- **NumLock Power-On State** enables or disables the power-up state of the **NumLock** key.

PCI Devices

The **PCI Devices** option displays and modifies the configuration of the PCI devices installed in the server. Information for each slot is displayed and the IRQs can be changed. Multiple PCI devices can share an interrupt.

Standard Boot Order (IPL)

The **Standard Boot Order (IPL)** option configures the Initial Program Loader (IPL) device. It controls the search order the server goes through to look for a bootable device.

Boot Controller Order

The **Boot Controller Order** option is used to view and assign the current controller order.

Date and Time

The **Date and Time** option is used to set the server date and time.

Automatic Server Recovery

The **Automatic Server Recovery** menu configures the Automatic Server Recovery (ASR) features and may include the following options:

- **ASR Status** enables or disables ASR. When set to **Disabled**, no ASR features function.
- **ASR Timeout** sets a timeout limit for resetting a server that is not responding. When the server has not responded in the selected amount of time, it automatically resets.
- **Thermal Shutdown** enables or disables the ability of the server to automatically power down when it reaches a dangerous temperature.

Server Passwords

The **Server Passwords** menu configures the password environment of the server. The available options are as follows:

- **Set Admin Password** sets a password to control access to the administrative features of the server. When this password is set, the administrative features of the server cannot be accessed without the correct password being entered.
- **Set Power-On Password** sets a password to control access to the server during power up. When this password is set, the server cannot be powered up without the correct password being entered.
- **Network Server Mode** is a security feature that protects an unattended network server while allowing it to run after a power interruption. When set to **Disabled**, the server operates normally. When set to **Enabled**, the following actions occur:
  - The local keyboard does not function unless the power-on password is entered.
  - When a diskette is not in the diskette drive, the power-on password is bypassed, allowing the server to start.
  - When a diskette is in the diskette drive, the server does not start unless the power-on password is entered locally.

  NOTE: Network Server Mode cannot be enabled until a power-on password has been established through the **Set Power-On Password** menu.
- **QuickLock** enables or disables the QuickLock feature. When set to **Enabled**, the keyboard is locked by pressing the **Ctrl+Alt+L** keys. The keyboard remains locked until the password is typed in.

  NOTE: If the password is disabled at the power-on key prompt, the QuickLock password feature remains active until the next time the server is turned on.

Server Asset Text

The **Server Asset Text** menu customizes the server-specific text, including the following:

- **Set Server Information Text** defines reference information for the server, such as **Server Name**, **Server Asset Tag**, **Server Primary OS**, and **Other Text**.
- **Set Administrator Information Text** defines reference information for the server administrator, such as **Admin Name Text**, **Admin Phone Number Text**, **Admin Pager Number Text**, and **Other Text**.
- **Set Service Contact Text** defines reference information for the service contact of the server, such as **Service Name Text**, **Service Phone Number Text**, **Service Pager Number Text**, and **Other Text**.
- **Serial Number** allows you to change the chassis serial number.

Advanced Options Menu

The **Advanced Options** menu enables you to configure advanced options of the system. The following selections are available on this menu:

- **MPS Table Mode** is automatically set based on the operating system selected and is used for interrupt routing. By default, this setting is **Auto Set Table**.
- **POST Speed Up** quickens POST by disabling the extended power-up memory test. By default, this setting is **Enabled**.
- **POST F1 Prompt** configures the server so that when an error is encountered during the power-up sequence, you must press the **F1** key to proceed (**Enabled** option) or the system pauses 10 seconds before proceeding (**Delayed** option). The **F1 Prompt** option can also be **Disabled**. By default, this setting is **Delayed**.
- **Redundant ROM Selection** toggles the server ROM between the current ROM and the backup ROM.
- **Erase Non-volatile Memory** resets the non-volatile memory of the server to an initial, factory state.

- **Erase NVRAM/Boot Space Disk** enables you to reset the configuration settings to their factory defaults and to erase the boot disk, including the operating system.
- **Set CPU Corrected** is used to indicate that the previously failed processor has been corrected or replaced.
- **Wake-On LAN** enables or disables the WOL feature for all NICs in the server. By default, this setting is **Enabled**.
- **NMI Debug Button** enables debug functionality when the system has experienced a software lock-up. By default, this setting is **Enabled**.
- **Custom POST Message** allows you to input a message that can be viewed during POST.
- **Processor Hyper-Threading** allows Intel Hyper-Threading technology to be enabled or disabled. Processor Hyper-Threading delivers two logical processors that can execute multiple tasks simultaneously using shared hardware resources of a single processor. By default, this setting is **Enabled**.

BIOS Serial Console Menu

The **BIOS Serial Console** option allows you to configure the serial port to view POST error messages and run RBSU remotely through a serial connection to the server COM port. The server that you are remotely configuring does not require a keyboard and mouse. For more information about BIOS Serial Console, and a copy of the *BIOS Serial Console User Guide*, refer to the HP FTP site (ftp://ftp.compaq.com/pub/products/servers/management/smartstart/bios-serialconsole.pdf).

Utility Language

The **Utility Language** option is used to set the language in which RBSU is displayed.

Auto-Configuration Process

The auto-configuration process automatically runs when you boot the server for the first time. During the power-up sequence that occurs, the system ROM automatically configures the entire system without needing any intervention. During this process, the Option ROM Configuration for Arrays (ORCA) utility, in most cases, automatically configures the array to a default setting based on the number of drives connected to the server.

Table 5-1: Auto-Configuration Process

Drives Installed	Drives Used	RAID Level
1	1	RAID 0
2	2	RAID 1
3, 4, 5, or 6	3, 4, 5, or 6	RAID 5
More than 6	0	None

Note: If the boot drive is not empty or has been written to in the past, ORCA does not automatically configure the array. You must run ORCA to configure the array settings.

To change any ORCA default settings and override the auto-configuration process, press the **F8** key when prompted.

By default, the auto-configuration process configures the system for a Microsoft Windows 2000 operating system and the English language. To change any default settings in the auto-configuration process, such as the settings for language, operating system, and primary boot controller, execute RBSU by pressing the **F9** key when prompted. After the settings are selected, exit RBSU and allow the server to reboot automatically.

For more information, refer to the *HP ROM-Based Setup Utility Guide* on the Documentation CD or the white paper on the HP FTP site (ftp://ftp.compaq.com /pub/products/servers/management/rbsu-whitepaper.pdf).

Boot Options

After the auto-configuration process completes, or after the server reboots upon exit from RBSU, the POST sequence runs, and then the boot option screen is displayed. This screen is visible for several seconds before the system attempts to boot from a diskette, CD, or hard drive. During this time, the menu on the screen allows you to install an operating system or make changes to the server configuration in RBSU.

For more information, refer to the *HP ROM-Based Setup Utility Guide* on the Documentation CD.

Redundant ROM Support

The server enables you to upgrade or configure the ROM safely with redundant ROM support. The server has a 2-MB ROM that acts as two separate 1-MB ROMs. In the standard implementation, one side of the ROM contains the current ROM program version, while the other side of the ROM contains the backup version.

Safety and Security Benefits

When you flash the system ROM, ROMPaq writes over the backup ROM and saves the current ROM as a backup, enabling you to switch easily to the existing ROM version if the new ROM becomes corrupted for any reason. This feature protects the previous ROM version, even if you experience a power failure while flashing the ROM.

Access to Redundant ROM Settings

Use ROMPaq utilities to create a backup ROM image before upgrading the configuration or to restore saved ROM data.

RBSU Access

To access the redundant ROM through RBSU:

1. Access RBSU by pressing the **F9** key when prompted at startup.
2. Select **ROM Selection** in the **Advanced Options** menu of RBSU.
3. Select one of the ROM banks as the system ROM.
4. Press the **Enter** key.
5. Press the **Esc** key to exit the current menu or press the **F10** key to exit RBSU.
6. Restart the server.

Manual Access

To access the redundant ROM manually

1. Power down the server. Refer to Chapter 2, "Server Operations."
2. Remove the front bezel. Refer to Chapter 2, "Server Operations."
3. Remove the access panel. Refer to Chapter 2, "Server Operations."
4. Set the system configuration switch positions 1, 5, and 6 to the **On** position.

   For the location of the system configuration switch, refer to Chapter 1, "Component Identification."
5. Power up the server. Refer to Chapter 2, "Server Operations."

   The ROM will beep and halt when the ROM images have been swapped.
6. Power down the server and reset all system configuration switch positions to the default **Off** position.
7. Power up the server.

If both the current and previous versions of the ROM are corrupted, refer to "ROMPaq Disaster Recovery" in Appendix D, "Server Specific Troubleshooting."

When the server boots, it identifies whether the current ROM bank is corrupt. If a corrupt ROM is detected, the server boots from the backup ROM and alerts you through POST that the ROM bank is corrupt.

ROMPaq

Flash ROM enables you to upgrade the firmware (BIOS) with system or option ROMPaq utilities. To upgrade the BIOS, insert a ROMPaq diskette into the diskette drive and boot the system.

The ROMPaq utility checks the system and provides a choice (if more than one exists) of available ROM revisions. This procedure is the same for both system and option ROMPaq utilities.

CAUTION: Do not power down during a firmware upgrade. A loss of power during upgrade may corrupt the firmware and prevent the server from starting.

For more information about the ROMPaq utility, refer to the HP website (www.hp.com/servers/manage).

System Online ROM Flash Component Utility

The Online ROM Flash Component Utility enables system administrators to efficiently upgrade system or controller ROM images across a wide range of servers and array controllers. This tool has the following features:

- Works offline and online
- Supports Microsoft Windows NT, Windows 2000, Windows Server 2003, Novell Netware, and Linux operating systems

IMPORTANT: This utility supports operating systems that may not be supported by the server. For operating systems supported by the server, refer to the HP FTP site (ftp://ftp.compaq.com/pub/products/servers/os-support-matrix-310.pdf).

- Integrates with other software maintenance, deployment, and operating system tools
- Automatically checks for hardware, firmware, and operating system dependencies, and installs only the correct ROM upgrades required by each target server

To download the tool and for more information, refer to the HP website (www.compaq.com/support/ files/server/us/webdoc/rom/RemoteROMUser-001.pdf).

USB Support

HP provides both standard USB support and legacy USB support. Standard support is provided by the operating system through the appropriate USB device drivers. HP provides support for USB devices before the operating system loading through legacy USB support, which is enabled by default in the system ROM. HP hardware supports USB version 1.1.

Legacy USB support provides USB functionality in environments where USB support is normally not available. Specifically, HP provides legacy USB functionality at:

- POST
- RBSU
- Diagnostics
- DOS
- Environments which do not support USB natively

For more information on ProLiant USB support, refer to the HP website (www.compaq.com/products /servers/platforms/usb-support.html).

SmartStart Software

The SmartStart CD is used to load the server software, thereby achieving a well-integrated server and ensuring maximum dependability and supportability. The SmartStart CD contains diagnostic utilities and ROMPaq tools.

SmartStart software enables you to:

- Install selected server operating systems using packaged product CDs.
- Install the latest optimized drivers.

- Create and copy standard server configuration scripts using the Scripting Toolkit and Configuration Replication Utility.
- Test server hardware using the new Enterprise Diagnostics LX32 Utility.
- Update the latest system or option ROM using the ROM Update Utility.
- Install software drivers directly from the CD. With systems that have internet connection, the SmartStart Autorun Menu provides access to the complete list of ProLiant System Software on the website.

To install the SmartStart software:

1. Press the **F9** key to run RBSU and configure the primary operating system.
2. Locate the SmartStart CD in the ProLiant Essentials Foundation Pack.
3. After you power up the server, press the CD-ROM drive eject button.
4. Insert the SmartStart CD into the CD-ROM drive with the labeled side up. Handle the CD by its edges, not by the flat surfaces of the disc.
5. When the busy indicator turns green, the SmartStart sequence begins.

Refer to the SmartStart documentation included with the server to install the operating system, create updated driver diskettes, and run upgrade utilities.

For more information about SmartStart software, refer to the HP website (www.hp.com/servers/smartstart).

SmartStart Autorun Menu

The SmartStart Autorun Menu enables you to access the latest system software directly from the operating system environment, simply by inserting the SmartStart CD into a configured system. The Autorun Menu enables you to:

- Install the latest ProLiant Support Packs.
- Create software diskettes for selected software.

SmartStart Scripting Toolkit

The SmartStart Scripting Toolkit is a set of Microsoft MS-DOS®-based utilities that enables you to configure and deploy servers in a customized, predictable, and unattended manner. These utilities provide scripted server and array replication for mass server deployment and duplicate the configuration of a source server onto target systems with minimum user interaction.

For more information, and to download the SmartStart Scripting Toolkit, refer to the HP website (www.hp.com/servers/sstoolkit).

Enterprise Diagnostics LX32 Utility

The Enterprise Diagnostics LX32 Utility displays information about the server hardware and tests the system to be sure that it is operating properly. To access the Enterprise Diagnostics LX32 Utility, refer to the SmartStart CD or refer to the HP website (www.hp.com/servers/manage).

For more information, refer to the Management CD in the *ProLiant Essentials Foundation Pack*.

Drivers

The server includes new hardware that may not have driver support on all operating system installation media. If you are installing a SmartStart supported operating system, use the SmartStart software and its Assisted Path feature to install the operating system and latest driver support. If you do not use the SmartStart CD to install an operating system, drivers for some of the new hardware are required. These drivers, as well as other option drivers, ROM images, and value-add software can be downloaded from the HP website (www.hp.com/support).

Option ROM Configuration for Arrays

Before installing an operating system, you can use the ORCA utility to create the first logical drive, assign RAID levels, and establish online spare configurations.

The utility provides support for the following functions:

- Configuring one or more logical drives using physical drives on one or more SCSI buses
- Viewing the current logical drive configuration
- Deleting a logical drive configuration

If you do not use the utility, ORCA will default to the standard configuration.

For more information about array controller configuration, refer to the *HP ROM-Based Setup Utility User Guide* on the Documentation CD.

Management Agents

The server is equipped with the latest Management Agents, allowing easy manageability of the server through Insight Manager 7 software, and third-party SNMP management platforms. Management agents monitor key subsystems that are instrumental in making health, configuration, and performance data available to the agent software. The agents act upon that data by initiating alarms in the event of faults. The agents also provide updated management information, such as network interface or subsystem performance statistics, to the management systems.

For additional information, refer to the Management CD in the *ProLiant Essentials Foundation Pack* or refer to the HP website (www.hp.com/servers/manage).

Insight Manager 7

Insight Manager 7 is a Web-based application that allows system administrators to accomplish normal administrative tasks from any remote location, using a Web browser. Insight Manager 7 provides device management capabilities that consolidate and integrate management data from HP and third-party devices.

IMPORTANT: You must install and use Insight Manager 7 to benefit from the Pre-Failure Warranty for processors, hard drives, and memory modules.

For additional information, refer to the Management CD in the *ProLiant Essentials Foundation Pack*.

Automatic Server Recovery-2

ASR-2 is a feature that causes the system to restart when a catastrophic operating system error occurs, such as a blue screen, ABEND (abnormal end), or panic. A system fail-safe timer, the ASR-2 timer, starts when the System Management driver, also known as the Health Driver, is loaded. When the operating system is functioning properly, the system periodically resets the timer. However, when the operating system fails, the timer expires and restarts the server.

ASR-2 increases server availability by restarting the server within a specified time after a system hang or shutdown. At the same time, the Insight Manager 7 console notifies you by sending a message to a designated pager number that ASR-2 has restarted the system. You can disable ASR-2 from the Insight Manager 7 console or through RBSU.

Survey Utility

Survey Utility gathers critical hardware and software information on servers running Microsoft Windows NT, Novell NetWare, SCO OpenServer, or SCO UnixWare operating systems.

IMPORTANT: This utility supports operating systems that may not be supported by the server. For operating systems supported by the server, refer to the HP FTP site (ftp://ftp.compaq.com/pub/products/servers/os-support-matrix-310.pdf).

If a significant change occurs between data-gathering intervals, the Survey Utility marks the previous information and overwrites the Survey text files to reflect the latest changes in the configuration.

To install the Survey Utility, use the Management CD in the *HP ProLiant Essentials Foundation Pack* or refer to the HP website (www.hp.com/servers/manage).

Integrated Management Log

The IML records hundreds of events and stores them in an easy-to-view form. The IML timestamps each event with 1-minute granularity.

You can view recorded events in the IML in several ways, including the following:

- From within Insight Manager 7
- From within Survey Utility
- From within operating system-specific IML viewers
  - For NetWare: IML Viewer
  - For Windows: Event Viewer or IML Viewer
  - For Linux: IML Viewer Application
- From within Enterprise Diagnostics LX32 Utility

For more information, refer to the *Servers Troubleshooting Guide* on the Documentation CD, or the Management CD in the *HP ProLiant Essentials Foundation Pack*.

Power-On Self-Test

POST is a series of diagnostic tests that checks firmware and assemblies to ensure that the server is functioning properly. This utility runs automatically every time the server is powered up.

Refer to Appendix D, "Server Specific Troubleshooting," for the normal power-up sequence and diagnosis of problems encountered during POST.

6

RAID Configuration and Management

Introduction to RAID

Overview of RAID

Redundant array of independent drives (RAID) is an array of multiple independent hard drives that can be accessed simultaneously, improving I/O (input/output) performance. The host computer recognizes the RAID array as a single storage unit or as multiple logical units. When a drive fails, RAID 1 and RAID 1+0 arrays can prevent data loss by reconstructing missing data from the remaining data drives.

RAID Terminology

IMPORTANT: Only RAID levels 0, 1, and 1+0 are supported by the Integrated ATA RAID Configuration Utility.

RAID 0 (Stripe)

RAID 0 is a RAID level that involves breaking up data into smaller blocks and then writing a block to each drive in the array (striping). RAID 0 does not provide any data redundancy, but does offer the best performance of any RAID level.

RAID 1 (Mirror)

RAID 1 is a RAID level that involves duplicating all data from one drive to a second drive (mirroring). RAID 1 provides complete data redundancy, but at the cost of doubling the required data storage capacity. You must have a minimum of two hard drives to support RAID 1.

RAID 1+0

RAID 1+0 (also known as RAID 10) is a RAID level that provides both striping and mirroring capabilities. RAID 1+0 mirrors data from one drive to another and then stripes the data across a second set of drives. You must have four hard drives to support RAID 1+0 on the server.

RAID 5

RAID 5 is not supported by the ProLiant ML330 Generation 3 server or the Integrated ATA RAID Configuration Utility. This RAID level stripes data and parity information across drives and requires a minimum of three hard drives.

Spare

The spare option in the utility assigns an extra, unused drive as a spare to be used in case of a drive failure. The spare drive will not be used during normal system operation, and provides no additional storage capacity. A pre-configured spare hard drive is brought into service only in the case of a RAID 1 failure.

IMPORTANT: The spare option is applicable only in RAID 1 for the server. If a spare is not available, the failed drive must be replaced with a new drive so that the data on the failed drive can be rebuilt. The replacement drive capacity must be greater than or equal to the failed drive it replaces.

Integrated ATA RAID Configuration Utility

The Integrated ATA RAID Configuration Utility is a standard feature of ATA models of the server. This section details the features of the utility, including how to access and change utility options.

Configuration Utility Features

The features of the Integrated ATA RAID Configuration Utility include the following:

- Optimized drive access
- RAID support before operating system loads
- Automatic detection and configuration (default is RAID 0)
- Support for PIO modes 0-4, MDMA modes 0-2, and Ultra DMA modes 0-5 (0-5 for ATA/100)
- Support for RAID levels 0, 1, and 1+0
- Multiple drive rebuilding
- Special handling of spare drive and rebuilding

Using the Configuration Utility

After all hard drives have been installed and connected, press the **F8** key during startup to run the Integrated ATA RAID Configuration Utility and view the setup screen.

IMPORTANT: If you do not run the configuration utility setup (**F8**), the option ROM will automatically configure the drives to individual RAID 0 arrays.

The setup screen has three menu windows:

- Array Information
- Physical Drive Information
- Help Information

Array Information

IMPORTANT: You cannot add drives or remove drives from an array that already has been configured, without destroying the data present on the already configured array.

The **Array Information** window of the setup screen displays all the drive arrays configured. Use this window to create, delete, or edit the existing configurations. Press the up arrow and down arrow keys to navigate the properties, and then press the **Enter** key to edit your selection. You can create additional arrays in this window. For more information, refer to the *HP ProLiant ML330 Generation 3 Server Maintenance and Service Guide*.

NOTE: To add additional arrays, follow the onscreen steps after an array configuration is selected. Refer to "Help Information" for more information about arrays.

Physical Drive Information

The **Physical Drive Information** window displays all the physical drives connected to the ATA/100 controller channels and their properties. Press the up arrow and down arrow keys to navigate this window. This window is not editable.

Help Information

IMPORTANT: When running the Configuration Utility, you may see RAID 0+1 displayed in place of RAID 1+0. RAID 0+1 and RAID 1+0 are used synonymously in this utility.

The **Help** window displays hints on available options and provides a list of keys that you can use to perform tasks, such as the following:

- **Switch Windows (Tab)**—switches the control back and forth between the **Array Information** and the **Physical Drive Information** windows.

- **Auto Configure RAID 0 (F1)**—automatically creates and configures a striped array based on the available physical drives installed.
- **Auto Configure RAID 1 (F2)**—automatically creates and configures a mirrored array based on the available physical drives installed. You must have a minimum of two free hard drives in the array.
- **Auto Configure RAID 1+0 (F3)**—automatically creates and configures a RAID 1+0 array based on the available physical drives installed. You must have four hard drives in the array.

  IMPORTANT: All previous settings are lost when the **Auto Configure** option is run for RAID 0, RAID 1, and RAID 1+0 arrays.

- **Create Array (F4)**—creates a drive array. When this option is selected, a default array template is created. You must edit the array properties to complete the array creation. Use the arrow keys to select a property field, and then press the **Enter** key to edit that property. The array properties are as follows:
  - **Array Type**—selects the intended RAID mode including RAID 0, RAID 1, RAID 1+0, and Spare. The default for the **Array Type** option is RAID 0.
  - **Drive(s)**—selects the drives for the array. This option refers to the drive number listed in the **Physical Drives Information** box, not the number of drives in the array. Use the arrow keys, and then press the spacebar to select or deselect the drive or drives. Press the **Enter** key when done. There is no default for this setting.
  - **Stripe Size**—changes the stripe size. This field applies only to RAID 0 and RAID 1+0 arrays. The default stripe size is 64 KB.

    IMPORTANT: RAID configurations do not support a stripe size less than 32 KB.

    You cannot change the stripe size of an array that has been configured already.

  - **Drive Size**—displays the size of the array and cannot be edited. If the array type is RAID 0, then the drive size is the total of all the drives selected. If the array type is RAID 1, drive size is shown by the smaller of the two drives making up the array.

— **Build Array**—is used to rebuild the array using a spare drive. When Build Array starts, it prompts the user to select the target drive, and then the rebuild starts. This option applies only to RAID 1 and RAID 1+0 arrays.

— **Initialize Array**—is used to clear the configuration information from drives attached to the Integrated ATA RAID controller.

- **Delete Array (F5)**—allows you to delete a currently configured array.
- **Restore Old Configuration (F6)**—restores the configuration that was there before you entered the utility.
- **Edit Options (F7)**—edits the physical drive option status boxes located in the top right corner of the **Physical Drive Information** window. The options are as follows:

  — **WC-OFF**—enables or disables write cache.

  CAUTION: Enabling write cache may cause data loss or corruption during an unexpected loss of power.

  — **DMA-ON**—enables or disables DMA (direct memory access) transfers, in which data is transferred directly from the memory to the hard drive without microprocessor intervention.

  Pressing the **F7** key allows you to enable or disable these options. Press the **F7** key, move the cursor to the desired box, and then press the spacebar to check off the option. When enabled, the option status boxes change from red to green.

- **Save and Exit (F10)**—saves the configuration and exits the utility.

  If you do not want to save the configuration or any changes that you have made, press the **Esc** key. Respond appropriately to the subsequent message boxes requiring confirmation.

Integrated ATA RAID Management Utility

The Integrated ATA RAID Management Utility is a standard feature of ATA models of the server. This section details the features of the utility, including how to access and change utility options.

Management Utility Features

The features of the Integrated ATA Management Utility include:

- Visual representation of array status using the **Applications** tray icon (Microsoft OS only)
- Writing of array status to log file (Linux, Netware, and Microsoft OS)
- Writing of array status to the console (Netware OS)
- Automatic rebuild of pre-configured online spares following a RAID 1 failure (Linux, Netware, and Microsoft OS)

Using the Management Utility

Once installed and running, no user intervention is required for the use of the Integrated ATA RAID Management Utility. The utility runs automatically at boot time.

If you must shut down the utility for any reason (such as updating to a newer version), follow OS-specific instructions in this section:

Microsoft Operating Systems

- Right-click on the **Spy** tray icon (a small, round character with sunglasses) and select **Quit Spy**. The Integrated ATA RAID Management Utility will quit.
- To restart the utility, perform one of the following actions:
  - — Log out of and back into Windows to restart the utility.
  - — Reboot the unit.
  - — Manually start the application.

Novell Operating Systems

- From the console, type `Unload Spy`. The system should respond with a message that the module has been unloaded.
- To start the utility again, simply type `Load Spy`. Once again, the system should respond with a message verifying this operation.

Linux Operating Systems

- From a prompt, type `Spy-Stop`.
- To restart the utility, type `Spy-Start`.

Troubleshooting

- Inconsistent naming may occur between the Power-On Self Test (POST) and the Integrated ATA RAID Configuration Utility. This inconsistency occurs when a drive has failed in a RAID 1 or RAID 1+0 configuration. The POST message lists the array as running in a `Degraded` state and the Integrated ATA RAID Configuration Utility lists it as being in a `Rebuilding` state. If this inconsistency occurs, the array must be rebuilt.
- If you add drives to a configuration, the **Integrated ATA RAID Management Utility** tray icon (which is seen only under Microsoft operating systems) may indicate yellow or red, depending on the array condition. The color change indicates one of the following situations:
  - — Errors are present on the array.
  - — Error data from an earlier application of the drive is present, and is mistakenly being presented as new errors. Right-click on the tray icon and select **Erase Error Log** from the menu. If these are new errors, they will be rediscovered by the server.

Drive Connection Tips

- If you have two drives, connect one on each ATA/100 RAID channel. Utilizing both channels enhances array performance.
- When attaching new drives to the array, be sure that any pre-existing configuration information has been cleared from the new drive. This may be accomplished by doing one of the following:
  - — Running the SmartStart Erase Utility on the drive (running SmartStart with only the new drive connected)
  - — Noting the position of the drive and editing any arrays (containing the newly added drive) presented in the Integrated ATA RAID Configuration Utility
- Use the same type of drives or drives with similar capability (in terms of speed and capacity).
- Do not use dissimilar drives on the same channel.
- Always use 80-conductor Ultra ATA cables.
- Be sure that proper jumper settings are used. For more information, refer to Chapter 1, "Component Identification."
- Do not connect any ATAPI devices (such as CD, ZIP, or LS120) to the ATA controller.

Configuration and Setup Tips

- To change the array configuration, back up the data first. When an array configuration changes, previous data in that array is lost.

NOTE: If you do not select a RAID level for a newly added drive, then the controller configures the drive as a stand-alone RAID 0.

- To respond to an unexpected message, such as `Drives Missing` or `Configuration Mismatch`, power down the server and check all connections, ATA cables, and power cables.
- To respond to a `Configuration Mismatch` message after adding new drives, press the **F8** key to go to the setup and create the array configuration as needed. The message displays because the new drives had been used before and the configuration on the drives was not cleared.

A

Regulatory Compliance Notices

Regulatory Compliance Identification Numbers

For the purpose of regulatory compliance certifications and identification, your product has been assigned a unique series number. The series number can be found on the product nameplate label, along with all required approval markings and information. When requesting compliance information for this product, always refer to this series number. The series number should not be confused with the marketing name or model number of the product.

Federal Communications Commission Notice

Part 15 of the Federal Communications Commission (FCC) Rules and Regulations established Radio Frequency (RF) emission limits to provide an interference-free radio frequency spectrum. Many electronic devices, including computers, generate RF energy incidental to their intended function and are, therefore, covered by these rules. These rules place computers and related peripheral devices into two classes, A and B, depending upon their intended installation. Class A devices are those that may reasonably be expected to be installed in a business or commercial environment. Class B devices are those that may reasonably be expected to be installed in a residential environment (i.e., personal computers).

The FCC requires devices in both classes to bear a label indicating the interference potential of the device as well as additional operating instructions for the user. The rating label on the device shows the class (A or B) of the equipment. Class B devices have an FCC logo or FCC ID on the label. Class A devices do not have an FCC logo or FCC ID on the label. Once the class of the device is determined, refer to the following corresponding statement.

Class A Equipment

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at personal expense.

Class B Equipment

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio or television technician for help.

Declaration of Conformity for Products Marked with the FCC Logo – United States Only

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

For questions regarding the product, contact:

Hewlett-Packard Company
P. O. Box 692000, Mail Stop 530113
Houston, Texas 77269-2000

or call 1-800-652-6672. (For continuous quality improvement, calls may be recorded or monitored.)

For questions regarding this FCC declaration, contact:

Hewlett-Packard Company
P. O. Box 692000, Mail Stop 510101
Houston, Texas 77269-2000

or call 281-514-3333.

To identify this product, refer to the part, series, or model number found on the product.

Modifications

The FCC requires the user to be notified that any changes or modifications made to this device that are not expressly approved by Hewlett-Packard Company may void the user's authority to operate the equipment.

Cables

Connections to this device must be made with shielded cables with metallic RFI/EMI connector hoods in order to maintain compliance with FCC Rules and Regulations.

Canadian Notice (Avis Canadien)

Class A Equipment

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Class B Equipment

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

European Union Notice

CE

Products bearing the CE marking comply with the EMC Directive (89/336/EEC) and the Low Voltage Directive (73/23/EEC) issued by the Commission of the European Community and if this product has telecommunication functionality, the R&TTE Directive (1999/5/EC).

Compliance with these directives implies conformity to the following European Norms (in parentheses are the equivalent international standards and regulations):

- EN 55022 (CISPR 22) – Electromagnetic Interference
- EN55024 (IEC61000-4-2, 3, 4, 5, 6, 8, 11) – Electromagnetic Immunity
- EN61000-3-2 (IEC61000-3-2) – Power Line Harmonics
- EN61000-3-3 (IEC61000-3-3) – Power Line Flicker
- EN 60950 (IEC 60950) – Product Safety

Japanese Notice

ご使用になっている装置にVCCIマークが付いていましたら、次の説明文をお読み下さい。

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスB情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。
取扱説明書に従って正しい取り扱いをして下さい。

VCCIマークが付いていない場合には、次の点にご注意下さい。

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BSMI Notice

警告使用者：

這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

Laser Devices

All HP systems equipped with a laser device comply with safety standards, including International Electrotechnical Commission (IEC) 825. With specific regard to the laser, the equipment complies with laser product performance standards set by government agencies as a Class 1 laser product. The product does not emit hazardous light; the beam is totally enclosed during all modes of customer operation and maintenance.

Laser Safety Warnings

WARNING: To reduce the risk of exposure to hazardous radiation:

- **Do not try to open the laser device enclosure. There are no user-serviceable components inside.**
- **Do not operate controls, make adjustments, or perform procedures to the laser device other than those specified herein.**
- **Allow only authorized service technicians to repair the laser device.**

Compliance with CDRH Regulations

The Center for Devices and Radiological Health (CDRH) of the U.S. Food and Drug Administration implemented regulations for laser products on August 2, 1976. These regulations apply to laser products manufactured from August 1, 1976. Compliance is mandatory for products marketed in the United States.

Compliance with International Regulations

All systems equipped with laser devices comply with appropriate safety standards including IEC 825.

Laser Product Label

The following label or equivalent is located on the surface of the HP supplied laser device.

This label indicates that the product is classified as a CLASS 1 LASER PRODUCT. This label appears on a laser device installed in the product.

Laser Information

Laser Type	Semiconductor GaAIAs
Wave Length	780 nm +/- 35 nm
Divergence Angle	53.5 degrees +/- 0.5 degrees
Output Power	Less than 0.2 mW or 10,869 W·m-2 sr-1
Polarization	Circular 0.25
Numerical Aperture	0.45 inches +/- 0.04 inches

Battery Replacement Notice

The computer is provided with an internal lithium battery or battery pack. There is a danger of explosion and risk of personal injury if the battery is incorrectly replaced or mistreated.

For more information about battery replacement or proper disposal, contact your authorized reseller or your authorized service provider.

WARNING: The computer contains an internal lithium manganese dioxide, or a vanadium pentoxide, or an alkaline battery pack. There is risk of fire and burns if the battery pack is not handled properly. To reduce the risk of personal injury:

- **Do not attempt to recharge the battery.**
- **Do not expose to temperatures higher than 60°C (140°F).**
- **Do not disassemble, crush, puncture, short external contacts, or dispose of in fire or water.**
- **Replace only with the spare parts designated for this product.**

Batteries, battery packs, and accumulators should not be disposed of together with the general household waste. To forward them to recycling or proper disposal, please use public collection system or return them to HP or to authorized resellers.

Power Cords

The power cord set included in the server meets the requirements for use in the country where you purchased the server. If you need use this server in another country, you should purchase a power cord that is approved for use in that country.

The power cord must be rated for the product and for the voltage and current marked on the product's electrical ratings label. The voltage and current rating of the cord should be greater than the voltage and current rating marked on the product. In addition, the diameter of the wire must be a minimum of 1.00 mm² or 18AWG, and the length of the cord must be between 1.8 m (6 feet) and 3.6 m (12 feet). If you have questions about the type of power cord to use, contact your authorized service provider.

IMPORTANT: Route power cords so that they will not be walked on or pinched by items placed upon or against them. Pay particular attention to the plug, electrical outlet, and the point where the cords exit from the product.

Mouse Compliance Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

B

Electrostatic Discharge

To prevent damage to the system, be aware of the precautions you need to follow when setting up the system or handling parts. A discharge of static electricity from a finger or other conductor may damage system boards or other static-sensitive devices. This type of damage may reduce the life expectancy of the device.

To prevent electrostatic damage, observe the following precautions:

- Avoid hand contact by transporting and storing products in static-safe containers.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free workstations.
- Place parts on a grounded surface before removing them from their containers.
- Avoid touching pins, leads, or circuitry.
- Always be sure you are properly grounded when touching a static-sensitive component or assembly.

Grounding Methods

Several methods for grounding exist. Use one or more of the following methods when handling or installing electrostatic-sensitive parts:

- Use a wrist strap connected by a ground cord to a grounded workstation or computer chassis. Wrist straps are flexible straps with a minimum of 1 megohm ±10 percent resistance in the ground cords. To provide proper ground, wear the strap snug against the skin.
- Use heel straps, toe straps, or boot straps at standing workstations. Wear the straps on both feet when standing on conductive floors or dissipating floor mats.
- Use conductive field service tools.
- Use a portable field service kit with a folding static-dissipating work mat.

If you do not have any of the suggested equipment for proper grounding, have an authorized reseller install the part.

For more information on static electricity or assistance with product installation, contact your authorized reseller.

C

Server Error Messages

For a complete listing of error messages, refer to the *Servers Troubleshooting Guide* on the Documentation CD.

D

Server Specific Troubleshooting

Use the sections in this appendix to diagnose server startup and installation problems.

For information on LEDs, switch settings, and jumpers, refer to Chapter 1, "Component Identification."

For information about general troubleshooting techniques, diagnostic tools, preventative maintenance, and a complete list of error messages, refer to the *Servers Troubleshooting Guide* on the Documentation CD.

When the Server Does Not Start

This section provides step-by-step instructions when encountering the most common problems during the initial Power-On Self-Test (POST). Every time the server boots, it must complete POST before it can load the operating system and start running software applications.

If the server completes POST and attempts to load the operating system, refer to "Problems After Initial Power Up" in this appendix.

WARNING: A risk of personal injury exists from hazardous energy levels. The installation of options and the routine maintenance and service of this product must be performed by individuals who are knowledgeable about the procedures, precautions, and hazards associated with equipment containing hazardous energy circuits.

When the server does not start:

1. Be sure that the server and monitor are plugged into a working outlet.
2. Be sure that the power source is working properly:
   - — Check the status using the system power LED.

     For the location and status of the system power LED, refer to Chapter 1, "Component Identification."
   - — Be sure that the Power On/Standby button was pressed firmly.

     For details on what else to check, refer to the *Servers Troubleshooting Guide*.
3. If the server does not complete POST, or it does complete POST but does not load the operating system, refer to the *Servers Troubleshooting Guide*.

   NOTE: If the server is rebooting repeatedly, be sure that the server is not restarting due to an Automatic Server Recovery-2 (ASR-2) power-up caused by another problem. Check Insight Manager 7 for notification of this event. Refer to the *Servers Troubleshooting Guide* for more information.
4. Restart the server.
5. Check for the following normal power-up sequence to be sure that the server meets the minimal hardware requirements and is powered up under normal operation:
   a. The front panel system power LED turns green.
   b. The fans start up.

c. The monitor displays messages regarding server initialization in the following sequence:

   Video initialization—The initialization screen is displayed.

   Processor initialization

   Memory test

   Memory initialization

   Diskette drive

   SCSI devices (if applicable)

   ATA devices (if applicable)

   Option ROM

d. The operating system loads to complete the boot process.

If the problem persists, continue with the section, "Diagnostic Steps," in this appendix.

Diagnostic Steps

If the server does not power up, or powers up but does not complete POST, answer the questions in Table D-1 to determine appropriate actions based on the symptoms observed. According to the answers you give, you will be directed to the appropriate table, which outlines possible reasons for the problem, options available to assist in diagnosis, possible solutions, and references to other sources of information.

Table D-1: Diagnostic Steps

Question	Action
Question 1: Is the system power LED amber?	If yes, press the Power On/Standby button and then continue to question 2. If no, refer to Table D-2.
Question 2: Is the system power LED green?	If yes, continue to question 3. If no, refer to Table D-3.
Question 3: Is the internal health LED green?	If yes, continue to question 4. If no, refer to Table D-4.
Question 4: Is the monitor displaying information?	If yes, use the POST messages for further diagnosis. If no, refer to Table D-5.

Table D-2: Is the System Power LED Amber?

Answer	Possible Reasons	Possible Solutions
No	The server is not connected to AC power or no AC power is available.	Be sure that the power cord is connected to the power supply.
	The power supply may not be inserted properly, it may have a damaged connector, or it may have failed.	Be sure that the power supply is undamaged and is fully seated.
	A broken connection exists between the following: • Power supply and system board • System board and power button/LED assembly • The power supply, system board, and/or power button/LED assembly may need to be replaced.	Be sure that the power supply cables are connected to the system board. Be sure that the power button/LED cable is connected to the system board and power button/LED assembly. Be sure that all pins on connectors and components are straight. Refer to the *Servers Troubleshooting Guide* for further options regarding power and general hardware problems. Contact the authorized service provider for assistance.
Yes	If the system power LED is amber: 1. Press the Power On/Standby button. 2. Refer to Table D-3.	

Table D-3: Is the System Power LED Green?

Answer	Possible Reasons	Possible Solutions
No	Power On/Standby button has not been pressed firmly.	Firmly press the Power On/Standby button.
	The power supply may not be inserted properly, it may have a damaged connector, or it may have failed.	Be sure that the power supply is undamaged and is fully seated.
	The system may have experienced a short.	Be sure that all pins on connectors and components are straight.
	The power supply, system board, and/or power button/LED assembly may need to be replaced.	Contact the authorized service provider for assistance.
Yes	If the system power LED is green, refer to Table D-4.	

Table D-4: Is the Internal Health LED Green?

Answer	Possible Reasons	Possible Solutions
No, it is amber	A processor or DIMM is in pre-failure condition.	Use amber failure LEDs to identify: • Missing components • Degraded components • Failed components • Improperly installed components Contact the authorized service provider for replacement parts and service.
No, it is red	A processor, PPM, or fan has failed. Processor 1 is not installed. A processor is an unsupported type. Processors are mismatched (speed and/or type). A DIMM has experienced a multibit error. No valid memory is in the system. The SCSI cabling or terminator configuration is incorrect on the SCSI controller. An overtemperature condition has occurred.	Use amber failure LEDs to identify: • Missing components • Degraded components • Failed components • Improperly installed components Contact the authorized service provider for replacement parts and service.
Yes	If the internal health LED is green, refer to Table D-5.	

Table D-5: Is the Monitor Displaying Information?

Answer	Possible Reasons	Possible Solutions
No	The monitor may not have power. Video may not be connected properly. Switches may not be correctly set on the system board. Nonvolatile RAM (NVRAM) may be corrupted. The system ROM and redundant ROM may be corrupted. The system board may need to be replaced.	Be sure that the monitor power cord is plugged in and that the monitor power switch has been pressed. If a video board is installed, be sure that the video board is seated properly and that the video cable is connected properly. If a RILOE II board is installed, be sure that the video cable is connected to the video connector on the RILOE II board. Check the video connections. Refer to the *Servers Troubleshooting Guide* for information on video problems. Be sure that the switch settings on the system board are correctly set. Clear NVRAM in RBSU. Are there any audible indicators, such as a series of beeps? A series of beeps is the audible signal indicating the presence of a POST error message. Refer to the *Servers Troubleshooting Guide* for a complete description of each beep sequence and the corresponding error messages. Contact the authorized service provider for assistance.
Yes	Video is available for diagnosis. Determine the next action by observing POST progress and error messages. Refer to the *Servers Troubleshooting Guide* for a complete description of each POST error message.	

Problems After Initial Power Up

After the server has passed POST, you may still encounter errors, such as an inability to load the operating system.

NOTE: If the server is rebooting repeatedly, be sure that the server is not restarting due to an Automatic Server Recovery-2 (ASR-2) power-up caused by another problem. Check Insight Manager for notification of this event. Refer to the *Servers Troubleshooting Guide* for more information.

Refer to the *Servers Troubleshooting Guide* for the following:

- Information you must collect when diagnosing software problems and to provide when contacting support
- Instructions on how to upgrade the operating system and its drivers
- Information on available recovery options and advice on minimizing downtime

Use the tables in this section to troubleshoot server installation problems that occur after the initial startup.

Table D-6: System Cannot Load SmartStart

Possible Cause	Possible Solution
A SmartStart requirement is not met.	Check the SmartStart Release Notes provided in the SmartStart Online Reference Information on the SmartStart CD. Refer to the HP website to check the version of SmartStart.
The wrong version of SmartStart is being installed.	

continued

Table D-6: System Cannot Load SmartStart *continued*

Possible Cause	Possible Solution
The CD-ROM drive is not installed properly. The CD-ROM drive cable is not connected properly.	1. Power down the server. 2. Be sure the CD-ROM drive is installed properly. 3. Be sure the CD-ROM is cabled to the back of the CD-ROM drive and the system board. For connection information, refer to the *HP ProLiant ML330 Generation 3 Server Maintenance and Service Guide*. If the cable is not the problem, refer to the *Servers Troubleshooting Guide* for other options.
The CD-ROM drive is not set as a bootable device.	1. Press the **F9** key to run the ROM-Based Setup Utility (RBSU). 2. Set defaults and exit the utility. 3. Rerun RBSU to check the system configuration. For complete instructions on the use of RBSU, refer to Chapter 5, "Server Configuration and Utilities," or refer to the *HP ROM-Based Setup Utility User Guide*.
The diskette in the diskette drive is preventing the system from loading.	Remove the diskette.
Existing software is causing conflict.	1. Clear the NVRAM and boot drives in RBSU. 2. Reinstall the operating system.

IMPORTANT: Clearing NVRAM removes user data from the boot drives. To clear NVRAM and erase the boot drives, select the **Advanced Options** menu in RBSU, and then select **Erase NVRAM/Boot Space Disk**.

Table D-7: SmartStart Fails During Installation

Possible Cause	Possible Solution
An operating system has not been selected.	1. Press the **F9** key to run RBSU. 2. Select the primary operating system.
An error occurs during installation.	Follow the error information provided. If necessary, clear NVRAM in RBSU and reinstall the operating system.
The CMOS is not cleared.	Clear NVRAM in RBSU and reinstall the operating system.
IMPORTANT: Clearing NVRAM removes user data from the boot drives. To clear NVRAM and erase the boot drives, select the **Advanced Options** menu in RBSU, and then select **Erase NVRAM/Boot Space Disk**.	

Table D-8: Server Cannot Load the Operating System

Possible Cause	Possible Solution
Required operating system step was missed.	Follow these steps: 1. Note at which phase the operating system failed. 2. Remove any loaded operating system. 3. Refer to the operating system documentation. 4. Install the operating system again.
Installation problem occurred.	Refer to the operating system documentation and to the SmartStart Release Notes on the SmartStart CD. Run RBSU and check the **OS Selection** menu.

continued

Table D-8: Server Cannot Load the Operating System *continued*

Possible Cause	Possible Solution
The primary hard drive controller installation is incorrect.	Run RBSU by pressing the **F9** key and correct this problem.
The hard drive controller order is incorrect.	
Problem was encountered with the hardware you have added to the system.	Refer to the documentation provided with the hardware.
Problem was encountered with hardware added to a new configure-to-order system (where available).	You must complete the factory-installed operating system software installation before adding new hardware to the system. Be sure you are following the instructions provided in the *HP Factory-Installed Operating System Software Installation Guide*. Remove the new hardware and complete the software installation. Then, reinstall the new hardware.

Note: For complete instructions on the use of RBSU, refer to Chapter 5, "Server Configuration and Utilities," or refer to the *HP ROM-Based Setup Utility User Guide*.

System Configuration Reset

It may be necessary at some time to clear and reset system configuration settings. When the system configuration switch position 6 is set to the **On** position, the server is prepared to erase all system configuration settings from both CMOS and NVRAM.

CAUTION: Clearing nonvolatile RAM (NVRAM) deletes the system configuration. For instructions on configuring the server, refer to Chapter 5, "Server Configuration and Utilities."

To reset system configuration settings:

1. Power down the server. Refer to Chapter 2, "Server Operations."
2. Remove the front bezel. Refer to Chapter 2, "Server Operations."
3. Remove the access panel. Refer to Chapter 2, "Server Operations."
4. Set the system configuration switch position 6 to the **On** position.

5. Power up the server. Refer to Chapter 2, "Server Operations."

   All configuration settings are now erased and all server operations halt.

6. When prompted during POST, power down the server.
7. Reset the position 6 switch to the default **Off** position.
8. Power up the server.
9. Reset all system configuration settings by pressing the **F9** key (or the **F8** key if you are using an ATA model) to run RBSU.

   For complete instructions on the use of RBSU, refer to Chapter 5, "Server Configuration and Utilities," or refer to the *HP ROM-Based Setup Utility User Guide*.

ROMPaq Disaster Recovery

If both the current and backup versions of the ROM are corrupt, perform ROMPaq disaster recovery procedures:

1. Create a ROMPaq diskette using the Autorun Menu on the SmartStart CD.
2. Power down the server. Refer to Chapter 2, "Server Operations."
3. Insert the ROMPaq diskette.
4. Power up the server. Refer to Chapter 2, "Server Operations."
   a. The server generates one long beep and two short beeps to indicate that you are in disaster recovery mode. If the diskette is not in place, the system continues to beep until a valid ROMPaq diskette is inserted.
   b. The ROMPaq diskette flashes both system ROM images. If successful, a sequence of ascending audible beeps is generated. If unsuccessful, a sequence of descending audible beeps is generated and you need to repeat the disaster recovery process.
5. Power down the server.
6. Remove the ROMPaq diskette.
7. Power up the server.

Other Information Resources

For additional troubleshooting information, refer to the *HP ProLiant ML330 Generation 3 Server Maintenance and Service Guide* and the *Servers Troubleshooting Guide* on the Documentation CD.

For information on warranties and service and support upgrades (Carepack services), refer to the HP website (www.hp.com/support).

E

Server Specifications

Server Specifications

Table E-1: Server Specifications

Specification	Value
Dimensions	
Height	42.0 cm (16.5 in)
Depth	48.5 cm (19.1 in)
Width	19.1 cm (7.5 in)
Approximate weight (depending on options)	18.18 kg (40 lbs)
Input specifications	
Rated input voltage	100 VAC to 199 VAC (U.S.) 200 VAC to 240 VAC (International)
Rated input frequency	50 Hz to 60 Hz
Rated input current	6 A (100 VAC to 199 VAC) 3 A (200 VAC to 240 VAC)
Input power	462 W
Output specifications	
Rated steady-state power	300 W
Maximum peak power	400 W

Environmental Specifications

Table E-2: Environmental Specifications

Specification	Value
Temperature range*	
Operating	50°F to 95°F (10°C to 35°C)
Shipping	-40°F to 158°F (-40°C to 70°C)
Maximum wet bulb temperature	82.4°F (28°C)
Relative humidity (noncondensing)	
Operating	10% to 90%
Non-operating	5% to 95%

***** All temperature ratings shown are for sea level. There is an altitude derating of 1°C per 300 m to 3,000 m (1.8°F per 1,000 ft to 10,000 ft).

F

Battery Replacement

If the server no longer automatically displays the correct date and time, you may need to replace the battery that provides power to the real-time clock. Under normal use, battery life is 5 to 10 years. When replacing a battery, use a CR2032 3V lithium coin cell battery.

WARNING: The computer contains an internal lithium manganese dioxide, a vanadium pentoxide, or an alkaline battery pack. A risk of fire and burns exists if the battery pack is not properly handled. To reduce the risk of personal injury:

- **Do not attempt the recharge the battery.**
- **Do not expose the battery to temperatures higher than 60°C (140°F).**
- **Do not disassemble, puncture, crush, short external contacts, or dispose of in fire or water.**
- **Replace only with the spare designated for this product.**

To remove the component:

1. Power down the server. Refer to "Powering Down the Server" in Chapter 2, "Server Operations."
2. Remove the front bezel. Refer to "Removing the Front Bezel" in Chapter 2, "Server Operations."
3. Remove the access panel. Refer to "Removing the Access Panel" in Chapter 2, "Server Operations."

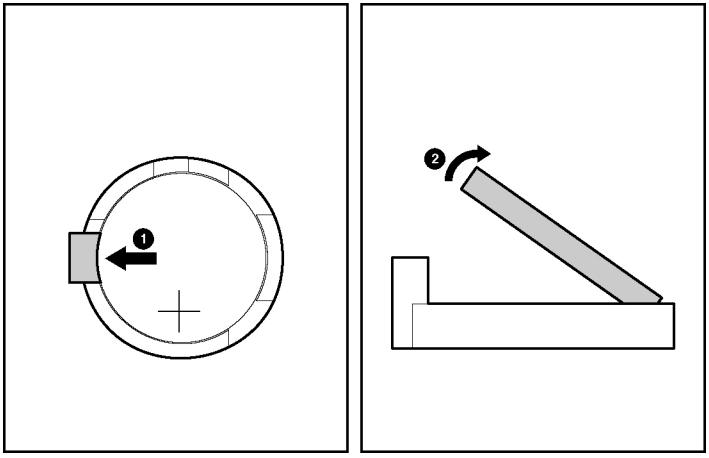
4. Locate the battery on the system board. Refer to Chapter 1, "Component Identification."

   NOTE: If you have expansion boards installed, it may be necessary to remove them to gain access to the battery. Refer to Chapter 4, "Hardware Options Installation."

5. Remove the battery:

   a. Press outward on the latch at the top of the battery holder to release the battery.

   b. Lift the battery away from the holder.



To replace the component, reverse the removal procedure.

IMPORTANT: Replacing the system board battery resets the system ROM to its default configuration. After replacing the battery, reconfigure the system through RBSU. Refer to Chapter 5, "Server Configuration and Utilities."

For more information about battery replacement or proper disposal, contact the authorized reseller or authorized service provider.

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